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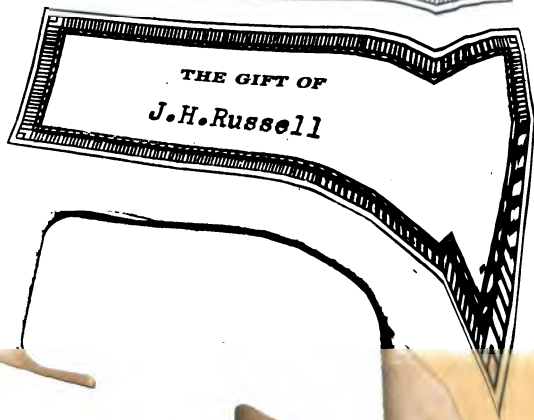
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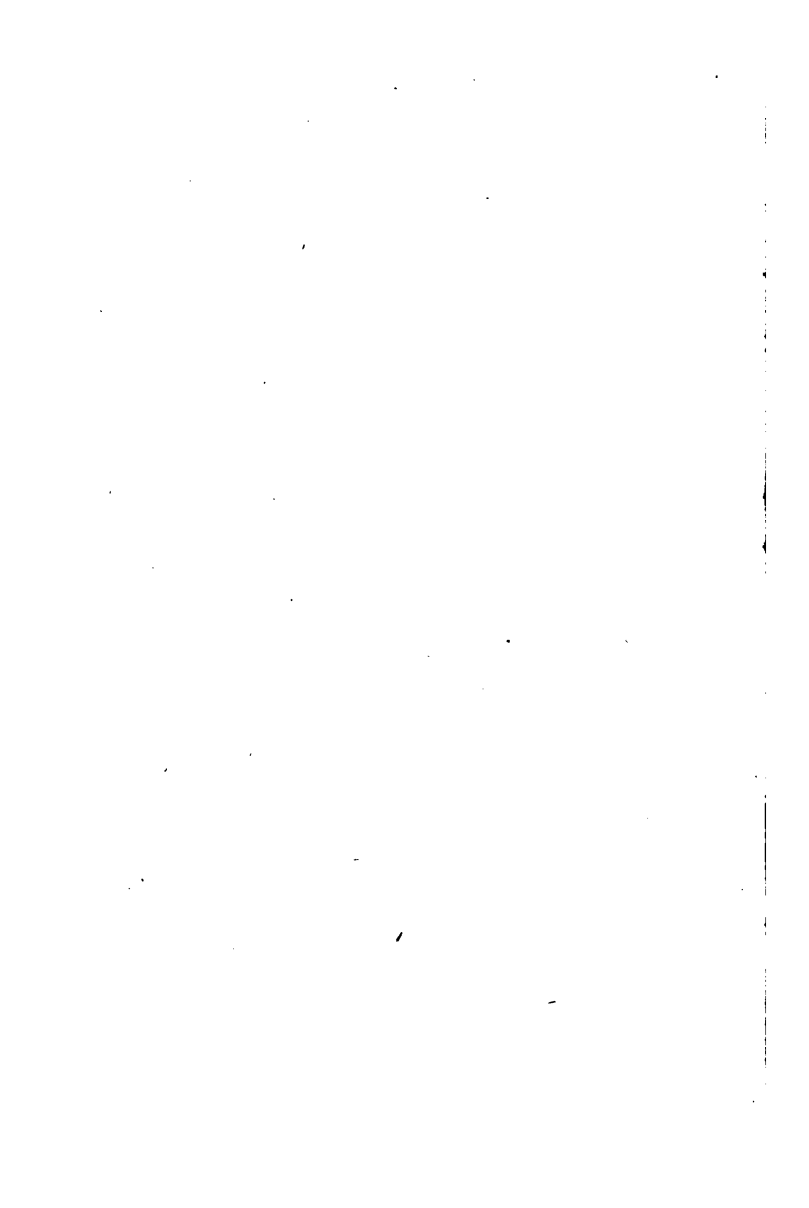
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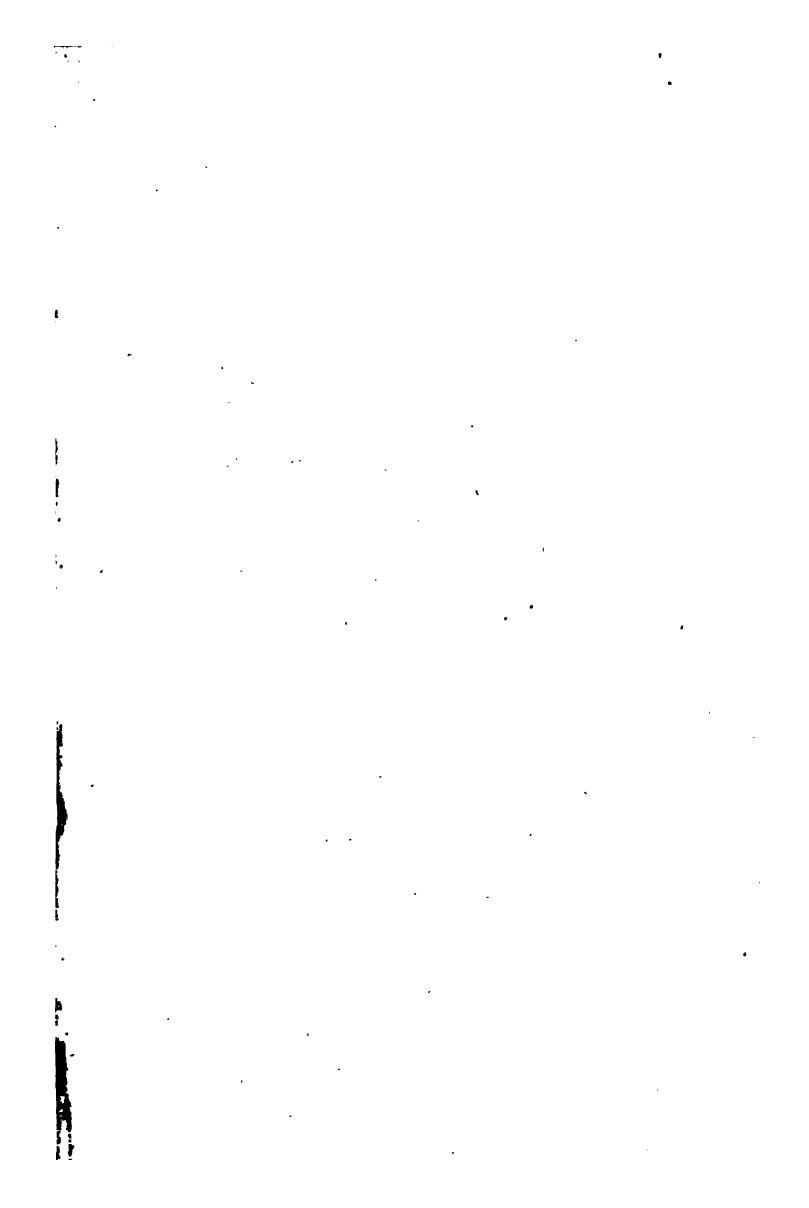
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GEOLOGICAL COSMOGONY;

OR,

AN EXAMINATION

OF THE

**GEOLOGICAL THEORY OF THE ORIGIN AND
ANTIQUITY OF THE EARTH,**

AND OF THE

**CAUSES AND OBJECT OF THE CHANGES IT HAS
UNDERGONE.**

BY A LAYMAN.

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GEOLOGICAL COSMOGONY.

CHAPTER I.

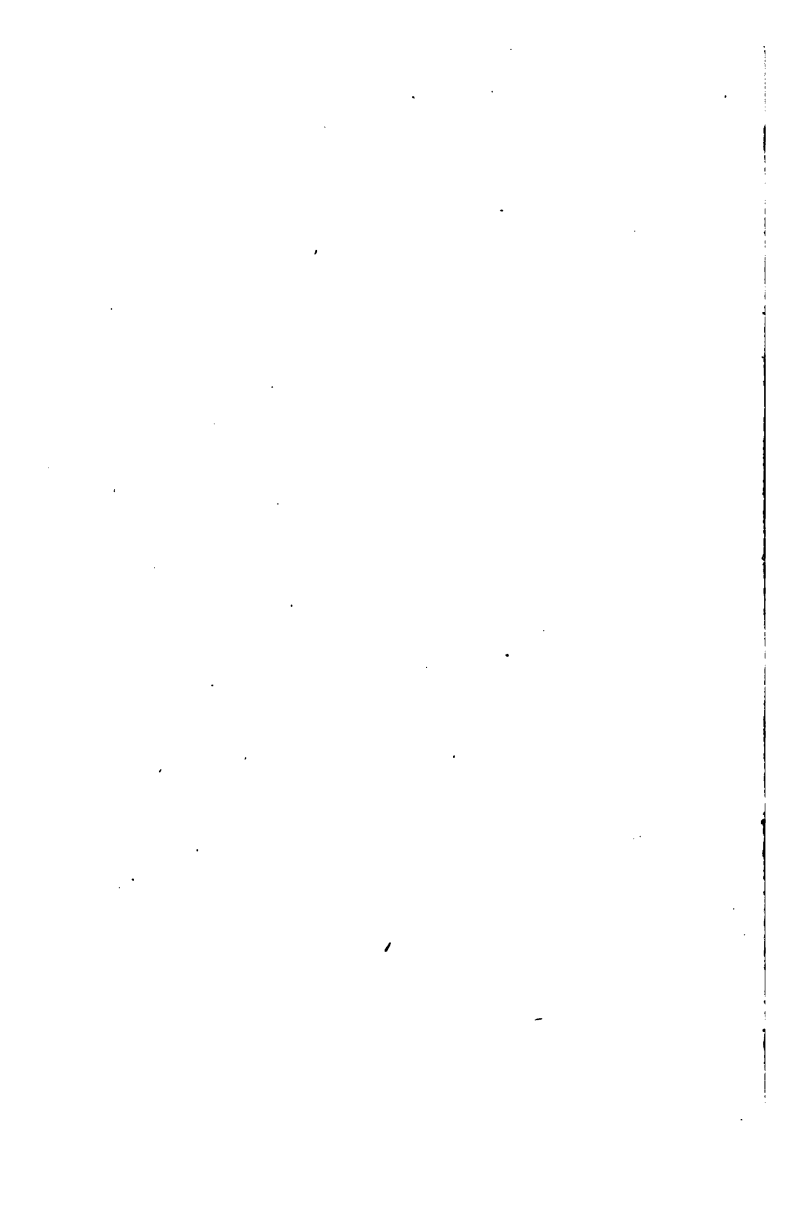
THE question, Whether the facts from which the geologists infer that the earth existed millions of ages prior to the Scripture era, are such as to render that conclusion unavoidable? is not so settled as to preclude further examination. Though the philosophers appear pretty generally to have adopted this theory of high antiquity, and though some ecclesiastics have been forward to profess their faith in it, and in its consistency with the Scriptures, there are not wanting those, to whom that construction of facts and appearances from which the inference is derived, is not satisfactory, and who deem it safe for the present to adhere to the cosmogony of the Bible. To such, the importance of the subject in its relation to the sacred volume will, it is presumed, render acceptable an endeavor

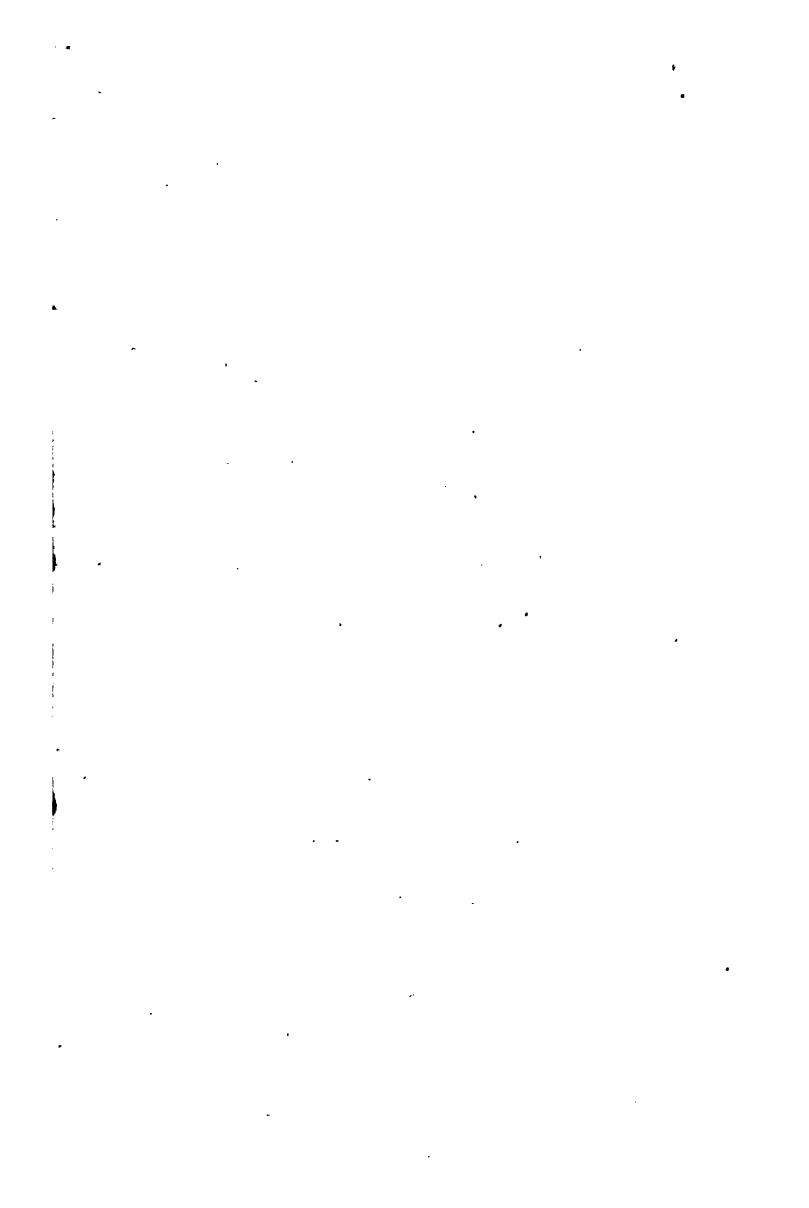
our to show that the modern geological theory, and the methods proposed for reconciling the Mosaic record with it, are not well founded; or at least that they are open to as grave objections as the Hebrew text or the commonly received chronology.

The facts discovered by geological research are freely admitted. There can be no rational motive to deny or doubt them; nor is it material to the point at issue, whether all of them are correctly reported or not, whether different geologists agree or disagree with respect to many of them, or whether or not there are innumerable other and similar facts yet undiscovered. The only questions of importance relate to the causes of those facts, their nature and mode of operation, and the inferences to be deduced from them. If the facts were caused in the manner supposed by the geologists, then their inference as to the lapse of ages must be admitted. If, for example, the stratified rocks and the fossil remains contained in them, were deposited by the gradual operation of the causes which are now producing analogous results, slowly ef-

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growths of plants and induce ferocity in animals, shorten the period of human life and require the extinction of many races of inferior creatures: if, having created a perfect world for the abode of man in a state of innocence, a world of boundless and spontaneous fertility, placed under his dominion, yielding without labour all that he could desire, and stocked with innoxious and harmless plants and animals, it became necessary for moral reasons to produce the changes referred to, then may the creation have taken place at the era indicated in the Scriptures.

Now the geologist makes his inference as to the causes and manner of these changes, chiefly from their magnitude, the great extent and depth of the sedimentary formations. The condition indeed in which some fossils are found, particularly some descriptions of shells, is alleged to be such as to imply that they were imbedded by a very gradual process. But nothing conclusive can be inferred from their position, their state of preservation, or other circumstances of their condition. For it is quite conceivable that if they were

rapidly inhumed, the materials employed in that process may have been so finely comminuted, and so diffused in the water, as to subside gently and equably without affecting their most fragile parts ; whereas, were the process of deposit extremely slow, it would be reasonable to expect, that owing to the natural decay of such shells while in course of being buried, and to the action of water on the exposed parts, the fossils would not be found in a perfect state.

Nor is any thing conclusive to be inferred from the discovery of animal remains of extinct species ; for though now extinct, they may, in the primitive condition of the earth, and prior to any material change in its climates or its fertility, have existed contemporaneously.

It is chiefly the magnitude of the results, which stumbles the geologist. He beholds with amazement a series of deposits, covering areas of great extent, and reaching to the depth of several miles. The aggregate appears to him too vast to be accounted for upon any supposition but that of the gradual

operation of natural causes continued through all but infinite periods of duration. No other causes appear to him to have been necessary even to have assisted in the process. He decides that, with the aid of unlimited drafts upon time, these formations must be their own interpreter.

Having adopted this theory, which appears to him to assign a philosophical cause, and which invests the subject with an enchanting air of antiquity and grandeur, his imagination takes wing. Difficulties, in construing subordinate details, disappear or are easily surmounted. The theory appears to account for the most important facts in a way easily comprehended, without the intervention of miracles, and in harmony with the principles of physical science and the ordinary course of events. It acquires an exciting and fascinating influence ; and comes, at length, to be considered as based upon more certain evidences and grounds of construction and inference, than are furnished by the laws of human language. The stratifications are finally regarded as the leaves of a book, or a series

of volumes, the language and records of which are involved in no ambiguity or uncertainty. He who has learnt that book, deems that he understands its import, beyond all peradventure ; nay, such is his confidence that he scarcely deigns to notice any objections founded on events or records which fall within so trifling a period as six thousand years. He has a world, an empire of his own, not of any modern or mushroom growth, not involved in mystery, not entangled with any questions which relate to man either as a moral or physical being ; a world, an empire, with which man had no connection, and whose agencies, subjects, and government comprised only animals and matter.

CHAPTER II.

The geological theory of antiquity is considered, by those who maintain it, as liable to objection only from a single quarter, namely, the inspired record. It commands the entire homage of those who disregard that

authority, and is assented to and defended by some professed friends of revelation. The latter class in their attempts to reconcile the Scriptures to this theory show how completely it infatuates them. They consider it the height of presumption to question the truth of the theory, or to doubt of its being firmly established ; while they seem to find no difficulty in adopting the most derogatory and preposterous interpretations of the language of inspiration, by which all pretence of certainty as to its meaning is exploded ; and to help out their hypotheses miraculous interpositions are introduced with familiarity.

There is a class of men, says Doct. John Pye Smith, in his work entitled " Scripture and Geology," " who affirm without hesitation, that there is a real and insuperable discrepancy, between the demonstrated facts of [geological] science, and the unambiguous declarations of the Mosaic writings. The two leaders in this course are Mr. Babbage, and Professor Baden Powell"—both of whom he reports as professed friends of Christianity.—
" The former of these philosophers thinks

himself compelled to resort to a desperate kind of hypothesis. 'He is of opinion 'that we cannot so depend upon our ability to construe the ancient Hebrew language, as to be sure that we have correctly interpreted the archaic documents before us.' Thus, to speak the plain truth, an opening is made, for treating the written records of the creation as if they had no existence."

"The second of these distinguished mathematicians and philosophers goes further. He has no difficulty in admitting the perfectly intelligible character of the commencement of Genesis, and the fourth commandment; but he considers it incumbent upon him to maintain, in both cases, that the statement was not intended for an Historial Narrative." 'The representation, he thinks, is made in the language of *figure and poetry*, or of *dramatic action*; the meaning being veiled in the guise of apologue and parable.'

Doctor Buckland in his endeavour (Bridgewater Treatise, chap. 2) to reconcile the first chapter of Genesis with this theory, after announcing it as his opinion that the first

verse refers to the creation of the material elements of the heavens and earth at a time long antecedent to the operations of the first day, and that millions of millions of years may have occupied the indefinite interval, observes : " that the second verse may describe the condition of the earth on the evening (i. e. the commencement) of the first day. This first evening may be considered as the termination of the indefinite time which followed the primeval creation announced in the first verse, and as the commencement of the first of the six succeeding days, in which the earth was to be fitted up and peopled in a manner fit for the reception of mankind." The chaotic state of the earth mentioned in the second verse, " may be geologically considered as designating the wreck and ruins of a former world. At this indeterminate period of time, the preceding undefined geological periods had terminated, a new series of events commenced, and the work of the first morning of this new creation was the calling forth of light from a *temporary darkness* which had overspread the ruins of the ancient

earth.”—“If we suppose all the heavenly bodies and the earth, to have been created at the indefinitely distant time, designated by the word beginning, and that the darkness described on the evening of the first day, was a temporary darkness, produced by an accumulation of dense vapours, ‘upon the face of the deep,’ an incipient dispersion of these vapours *may have* re-admitted light to the earth upon the first day, whilst the exciting cause of light was still obscured ; and the further purification of the atmosphere upon the fourth day, *may have* caused the sun and moon and stars to re-appear in the firmament of heaven, to assume their new relations to the newly modified earth and to the human race.”

Now it is obvious to remark, that all these hypothetical statements, and others not here quoted, are rendered necessary solely by the assumption that the creation announced in the first verse refers to an antecedent period indefinitely remote. That assumption renders it necessary to suppose a miracle by which the work of the preceding interminable period, the whole process of stratification and

deposit of fossils, was rendered null and void, the earth being brought into such a state of chaos and confusion as to require to be remodelled and fitted up for the reception of mankind. It is, however, quite certain that no such miracle occurred ; for the stratifications and fossil deposits, alleged to have taken place during the supposed millions of millions of years, remain, at present, in the same state and the same relative position, in which, even by the argument of the geologists themselves, to prove their antiquity, they were originally deposited. Their argument, if it proves any thing, proves that, since these deposits were made, no chaos, no state of wreck and ruin, or remodelling of the earth has taken place. A chaos and reconstruction would surely have deranged the leaves of the petrified book, and rendered the reading of it an impossibility. Moreover, that part of their argument, which goes to show that the object of those stratifications, which are supposed to have occupied such a waste of years, was to bring the earth into a condition fit for the habitation of man, is at war

with the miracle; for the supposition of an intervening chaos and reconstruction is as inconsistent with the alleged object, as is the present actual condition of the strata.

Without going into any further detail of Doct. Buckland's explanations, suffice it to say, that if his hypothesis be adopted, the first chapter of Genesis should be read substantially as follows :

‘In the beginning the heavens and the earth were created, formed, produced or made. The earth was in a state of igneous fluidity. As soon as portions of the surface became cool enough to admit of the existence of certain plants and animals, they were created : and at successive periods, during millions of millions of years, others of different species were produced or had their beginning, of which, as they died off, the remains were gradually covered up by the detritus of rocks slowly disengaged by the action of the elements. This process occupied the first or geological period of the earth. At its close, the whole was thrown into confusion, chaos, wreck and ruin, which put an end to

all the forms of life, and caused a temporary darkness. It was now, in the space of six days, to be reorganised, arranged, and brought into a state fit for the residence of man, and supplied with new tribes of plants and animals. Accordingly, on the first of the six days, by an incipient dispersion of the dense vapours which temporarily hid the sun, a degree of light was called forth. On the second day, the waters under the firmament were separated from those above. On the third day, the waters under the firmament were gathered into seas, and the dry land, called earth, namely the ancient earth which had been temporarily submerged by being thrown into a state of chaos and ruin, reappeared, and brought forth grass and seed bearing herbs and fruit trees. On the fourth day, owing to a further purification of the atmosphere, the sun, moon, and stars became visible in the firmament and assumed their new relations to the newly modified earth and the human race. On the fifth day, the winged tribes and all creatures living in water were made : and on the sixth, all living crea-

tures which occupy the dry land, and last of all man, for whose accommodation the earth was thus reconstructed and furnished, out of the ruins of a former world.'

Doct. J. P. Smith has some peculiar views, though he agrees with others in supposing the date of the earth to be incalculably earlier than that of man's creation. He however believes its origin to have been a creation out of nothing, and that there was a prior eternity. Creation, in the Mosaic record of the "six days," means, in his opinion, "made, adjusted, arranged, appropriated to new purposes,"—and refers only to "the part of our world which God was adapting for the dwelling of man and the animals connected with him."—He is convinced that the narrative of the six days has no wider application than this:—"a description, in expressions adapted to the ideas and capacities of mankind in the earliest ages, of a series of operations, by which the Being of omnipotent wisdom and goodness adjusted and furnished the earth generally, but, *as the particular subject under consideration here, a PORTION* of its surface, for most glo-

rious purposes; in which a newly formed creature should be the object of those manifestations of the authority and grace of the Most High, which shall to eternity show forth His perfections, above all other methods of their display."

He locates this favoured "portion" in Asia, "between the Caucasian ridge, the Caspian sea, and Tartary on the north, the Persian and Indian seas on the south, and the high mountain ridges which run, at considerable distances, on the eastern and western flanks." Having thus selected a site for the six days' operations, he has no great difficulty with what he terms the child-like narrative, drawn up for man in his infant state;—that is about A.M. 2,500.

"This region," he continues, "was first, by atmospheric and geological causes of previous operation under the will of the Almighty, brought into a condition of superficial ruin, or some kind of general disorder. With reverence I propose the supposition, that this state was produced by the subsidence of the region,—probably by a vast movement of the igneous mass below. Extreme darkness

has often been known to accompany such phenomena." 'Both this darkness, and the deep waters on which it rested were the effect of the extensive subsidence of the land, a deluge naturally flowing in from a sea or rivers.' "The Divine power acted through the laws of gravity and molecular attraction; and where requisite in an immediate, extraordinary, or *miraculous* manner." The atmosphere being so far cleared up as to admit a degree of light, "elevations of land took place by upheaving igneous force; and consequently the waters flowed into the lower parts, producing lakes, and probably the Caspian sea, which manifestly belonged to the very region. The elevated land was now clothed with vegetation, instantly created. By the fourth day, the atmosphere over this district had become pellucid; and had there been a human eye to have beheld, the brightness of the sun would have been seen, and the other heavenly bodies after the sun was set."—After speaking of the production of animals, he observes that, "the heavenly bodies are represented, not as being at that time created, but

made, constituted, or appointed to be luminaries," apparently forgetting that on the theory of their previous creation, they had been luminaries during untold ages.

It requires but small genius to invent an hypothesis like this, or one every way as good, the liberty of calling in the aid of miracles being granted; but the publication can scarcely be accounted for unless we suppose the author to have been completely infatuated by a theory which had been his hobby for many years.

The favoured portion of the earth above referred to, serves the author as the basis of another hypothesis, namely, that of its having been the scene of the Noachic deluge; which, instead of being universal, was, he thinks, confined to this same region. Of necessity he has, however, recourse again to miracles, though, when controverting others, he says with much gravity: "I humbly think, that for the honour of God and the interests of genuine religion, it is our duty to protest against the practice of bringing in miraculous inter-

positions, to help out the exigencies of arbitrary and fanciful theories."

Concerning the deluge he writes as follows: "If in addition to the tremendous rain, we suppose an elevation of the bed of the Persian and Indian seas, or a subsidence of the inhabited land towards the south, we shall have sufficient causes, in the hand of Almighty justice, for submerging the district, covering its hills, &c. The draining off of the waters would be effected, by a return of the bed of the sea to a level, or by the elevation of some tracts of land, which would leave channels and slopes for the larger part of the water to flow back into the Indian ocean, while the lower part remained a great lake, or an inland sea,—the Caspian."

This hypothesis requires that the ark should not have rested on Mount Arrarat; and accordingly he is satisfied that it did not rest there. The top of that mountain is, now at least, in the region of perpetual frost. There was not, he argues, water enough to cover it; and if there had been, Noah and the animals with him could not have descended its

steep and slippery sides, without the aid of a miracle.—The reader is left to conclude that a miracle would have been out of place, on that occasion, though convenient and proper enough to sink the selected “region” or raise the Indian ocean at the required point of time.

It is to the authors of such hypotheses that we are expected to look for the true construction of geological facts. As a specimen of them Doct. Smith is doubtless one of the best. He is borne down by what appears to him to be irresistible evidence of the truth of the geological conclusions which he adopts; is distressed by their contrariety to the inspired records, labours hard to effect a reconciliation, and in the end thinks he has succeeded, and feels convinced, “that the Scriptures, fairly interpreted, are not adverse to a belief in an immeasurably high antiquity of the earth; in the reference of the ‘six days’ work,’ to a part only of the earth’s surface; in the position of several centuries of creation distinct from each other on the surface of the globe; in the reign of death over the inferior animals

prior to the fall of man ; and in a limited extent of the deluge."

Of Mr. Lyell's "Principles of Geology," something requires to be said. The theory which controls or modifies all his observations, inferences and opinions, is, that all the changes which have taken place in the "crust" of the globe, the formation and upheaval of the primary rocks, their decomposition, the deposit of the sedimentary rocks, and their fossil contents, their change of position, local changes of land and sea, earthquakes, deluges, and in short all the phenomena which the earth exhibits, are due to the ordinary operation of those natural causes which are still effecting like results. He excludes all extraordinary interpositions, and supposes that these natural causes never operated with any more energy than they have done during the last 3000 years. He allows of no greater violence or frequency of volcanoes, earthquakes, or other disturbing forces, by which mountain ranges were elevated, or continents made to occupy the places of former seas, in the earlier than in recent periods. Our experience, for the last 3000 years, he deems a sufficient argument

against the probability of any crises, any extraordinary violence of the subterranean action, having occurred previously. 'It is contrary to the analogy of this experience,' he argues, 'to suppose that nature has, at any former epoch, been parsimonious of time and prodigal of violence; to imagine that one district was not at rest while another was convulsed. If it could be shown that a certain combination of circumstances would at some future period produce a crisis in the subterranean action, we should have no right to oppose this experience of 3000 years, to the probability of such occurrences in past ages; but such a combination cannot be foreseen.'—As much as to say, there can be no objection to granting periods long enough to account for all the changes by the gradual operation of ordinary second causes; and granting such indefinite periods, there is no necessity of supposing that there has ever been any reason or occasion, for more violent or rapid progress of change; and unless we can clearly foresee such a reason or occasion

in the future, we have no right to suppose there ever was one.

Such evidences, however, exist, of sudden, extraordinary, and violent action of water, as to require at least a hypothetical dispensation of this element from the rule of uniform action. Accordingly he thinks we can foresee deluges like those of former times; and observes, that "in speculating on catastrophes by water, we may certainly anticipate great floods in future; and *we may therefore presume* that they have happened again and again in past times;" and we may "introduce them into geological speculations respecting the past, provided we do not imagine them to have been *more frequent or general* than we expect them to be in time to come."

In this way he lays a foundation for reasoning in a circle whenever his theory of antiquity and causation requires it. Taking the position that the order of nature is now uniform, and has continued so for several thousand years, he assumes that it always was so; and construes all the phenomena he meets with accordingly. If we take it for

granted at the outset that his theory is true, then his constructions and inferences generally must be admitted ; but they are not such of themselves as to prove the truth of the theory. The numerous instances which he has collected, and which evince extraordinary labour and ingenuity, of the results of this uniform course of physical operations in modern times, lose all their importance as grounds of argument in support of this theory, unless the truth of the theory itself be first assumed ; in which case, indeed, it must be allowed to derive a seemingly cumulative support from the numerous facts which he cites, and the relations and analogies which he ingeniously assigns to them. In the progress of his work, he dissents from the now prevalent notion of internal heat, deeming it deficient of evidence, and too much a matter of mere speculation and hypothesis. Yet elsewhere he observes that, "in the rocks of high antiquity, many organic forms have been obliterated by various causes, such as *subterranean heat*, and the percolation of acidulous waters,

which have operated during a long succession of ages."

He does not assume the eternity of the earth or of the present system of changes. That question he leaves as one which geological researches and reasonings cannot determine. "It has been urged," he remarks, "that as we concede the astonishing fact of the first introduction of a moral and intellectual being, so also we may conceive the first creation of the planet itself. I am far from denying the weight of this reasoning from analogy; but although it may strengthen our conviction, that the present system of changes has not gone on from eternity, it cannot warrant us in presuming that we shall be permitted to behold the signs of the earth's origin, or the evidences of the first introduction into it of organic beings."

The introduction of man he regards as an event of no more significance in relation to the objects of his inquiry, than the introduction of any new race of animals. He contemplates man in this relation as a physical being, and alludes to his moral nature only

so far as to account for his greater interference with the irrational tribes under some circumstances than under others. He supposes "the general condition of the globe immediately before and after the period when our species first began to exist, to have been the same, with the exception only of man's presence;" and limits his interference to his cultivating the earth, subduing and destroying animals and the like.

His views are not embarrassed by references to any thing contained in the sacred volume, except in a brief section on the "supposed effects of the flood." The only rational inference which can be made from his work as a whole, is, that the earth is eternal, and has been subject to an unvarying and ceaseless round of change from existing physical causes.

CHAPTER III.

It would be tedious to notice at any greater length the attempts which have been made to reconcile the Scriptures with the foregoing

conclusions of the geologists. Nor is it needful; enough, it is presumed, has been said to show that those attempts fall very far short of what the case requires. What they offer is anything but satisfactory; and in place of adopting any of the hypotheses proposed, it were better and safer to conclude, that if the present geological theory respecting the age of the world, the successive creations of animals, &c., be true, it must be consistent with all that is revealed in the Bible, though it be impossible to make its consistency apparent.

But is that theory true? Are the geologists correct in their inferences and conclusions from the facts of their subject? Are they safe in placing such bold reliance on those inferences, when at variance with plain Scripture statements and implications? Have they not, amid the novelties and physical wonders disclosed by their researches, yielded themselves quite too easily to this captivating theory, and shut their eyes to whatever might threaten to disturb it?

Let it be observed that they all take a widely different view of the object or reason of

the changes in the state of the earth, from that which the Scriptures inculcate. They teach us that it was the object of those changes to improve the condition of the earth, and render it more perfect than it was originally. They suppose the earth to have been at first in an exceedingly imperfect state, a state wholly unsuited to the existence of animal or vegetable life, a state of igneous fluidity ; and that the changes, which occupied myriads of ages, had it for their object to prepare the surface step by step, for the tribes of plants and animals, which at successive periods were created to occupy it.

Some of them suppose, that after this prolonged course of operations, the whole was thrown into a state of chaos and ruin, as if all that had been effected was futile and nugatory as to rendering the surface fit to be occupied by organic beings ; and that out of the ruins it was reconstructed for the residence of man, but subject, nevertheless, after the reconstruction to the same processes of change as before.

Others are of opinion, that after being so

long in a course of preparation for organic life, it was not universally whelmed in ruin, but only a portion of it ; and that the reconstruction was confined to that portion, which Moses, though writing for future generations, represented, conformably to the puerile notions of his predecessors, as the whole earth.

Now if the changes which are alleged to have occupied such vast tracts of time, were designed to improve the condition of the surface and render it fit for the purposes of organic life, why were they rendered nugatory by a miraculous interposition, throwing the whole back into a state of chaos ? Were they designed and controlled by infinite wisdom, and yet failed of their object ? If the geological theory of antiquity is true, the process of wreck and ruin must have taken place, or else there was no reconstruction, no new creation, fitting up, adjustment, or making of anything, and the Mosaic account must be rejected altogether. This the geologists clearly perceive, and some of them neither suppress nor disguise the unavoidable inference. They find in the volumes of stratifi-

cation no evidence that the strata have ever been thrown into a state of chaotic disorder, but quite the contrary. The strata are found just as they should be, just as they were when originally deposited, excepting the changes which have depressed or elevated, and given them an inclined position : and the geologists believe that the same processes by which the ancient deposits were formed are still going on with as much activity as ever, and with the like tendency and object. They need no book claiming to be inspired, to inform them that man and certain animals adapted to his use, were brought into existence at the proper period, or that the period was recent. This was but a matter of course ; and had they lived when the first pages of the petrified volume were completed, or when the first trilobite was inhumed, they could have foretold it, and shown from analogy, that man would live, make war on his own and other species, and die much after the manner of other animals. His creation was but one of a series of creations, which took place from time to time, as occasions arose, and it would be, in their view,

highly presumptuous to conclude that it was the last of the series.

Those whose regard for the Bible will not permit them to go all these lengths, nevertheless hold to the wreck and ruin miraculously superinduced, to give occasion to the remodeling and fitting up which they believe to have taken place on the "six days ;" leaving it to others to imagine what purpose worthy of infinite wisdom and goodness had been accomplished during the preceding myriads of ages, and to conceive how the whole could have been thrown into chaotic disorder, and yet be found at present as it was before.

The Scriptures, on the other hand, plainly teach us, that the world as it was created was in a perfect state ; not a fluid, igneous mass, but earth and water ; a state adapted to the immediate and most exuberant production of plants and animals. At the close of the sixth day, all the works of that and the preceding days are pronounced good. "Thus the heavens and the earth were finished, and all the host of them. And God blessed the sev-

enth day, and sanctified it ; because that in it he had rested from all his works which God created and made."

The design of the creation, and its connection with moral purposes and results, elsewhere disclosed in the sacred writings, abundantly imply, that it was originally perfect, and that, instead of its having been afterwards improved in its condition, the changes it has undergone have taken place in consequence of the apostacy and depravity of man. Accordingly the catastrophes recorded in the Bible, are announced as penal inflictions. Man sinned, and the earth was cursed for his sake. The extreme wickedness of his early descendants, gave occasion to the deluge, "to destroy them with the earth." The guilt of Sodom and Gomorrah, brought destruction upon those cities ; they were condemned with an overthrow, burned, and made "an example unto those that afterwards should live ungodly."

The Scriptures teach us that the earth was cursed on account of man's apostacy, and that

when the consequences of his revolt shall be overcome, and the curse removed, it will be renovated and restored to its original perfection.

CHAPTER IV.

The following extracts from different works on Geology will sufficiently indicate the views of the authors on the points to which they relate.

“As the materials of stratified rocks are in great degree derived directly or indirectly from those which are unstratified, we commence our inquiry at that most ancient period when there is much evidence to render it probable that the entire materials of the globe were in a fluid state, and that the cause of this fluidity was heat. The form of the earth being that of an oblate spheroid,—is that which a fluid mass would assume from revolution round its axis. The nebular hypothesis offers the most simple and therefore the most probable theory respecting the first con-

dition of the material elements that compose our solar system.”—*Buckland*.

“The nebular hypothesis in its relations to the planetary system may be termed complete ; it comprehends its beginnings, establishes those elements on which its duration depends, and exhibits the causes and mode of its ultimate transition into a novel form ; and thus surveying it from its commencement to its close, we are as if in possession of that primeval Creative Thought which originated our system, and planned and circumscribed its destiny.” “If that nebular hypothesis be true, all the forces developed upon the surface of our planet, and which have given rise to geological transitions, stretching through periods in which the existence of the human race is an invisible speck, will have resulted during a stage of condensation in a secondary nebula, which no instrument from any fixed star could possibly detect.” “Our supposed origin of the planets gave them and their satellites that kind of orbits, and that kind of rotation, which produced their permanence ;

and the inherence of this same nebulous parentage, viz : the existence of an ether, leads gently to their decline."—*Nichol*, pp. 82, 106, 108.

"The nebular hypothesis, ridiculed as it has been by persons whose ignorance cannot excuse their presumption, is regarded as in a very high degree probable by some of the finest and most Christian minds. If I may venture to utter my own impressions, I must profess it as the most reasonable supposition, and the corollate of the nebular theory, that God originally gave being to the primordial elements of things, the very small number of simple bodies, endowing each with its own wondrous properties."—*Smith*.

"The evidence of geological phenomena constrains us to the belief, that our earth has existed, has been the seat of life, and has undergone many changes of its surface, through periods of time utterly beyond human power to assign. That evidence is of distinct and independent kinds, *chiefly* derived from the

appearance of stratification and the remains of animal and vegetable life.”—*Smith*.

“The best writers abound in general expressions ; such as ‘immense periods of time—undefined, yet countless ages—a duration to which we dare not assign a boundary—a work infinitely slow—a space of time from the contemplation of which the mind shrinks—a long succession of monuments, each of which may have required a thousand ages for its elaboration—successions of events where the language of nature signifies millions of years.’”—*Mantell, McCulloch, Sedgwick, and others, quoted by Smith*.

“The whole series of strata, from the earliest of them to the present surface of the globe, exhibits a body of evidence in favour of our doctrine [of antiquity.] Every stratum, partially excepting the limestones, consists of a mass of earthy matters which once formed the substance of rocks on elevated land. Those portions of the rocks have been separated from their parent masses, worn down,

comminuted, transported often to great distances by the force of water, deposited, consolidated and hardened."—*Ibid.*

"Beneath the whole series of stratified rocks that appear on the surface of the globe, there probably exists a foundation of unstratified rocks, bearing an irregular surface, from the detritus of which the materials of stratified rocks have in great measure been derived either directly by the accumulation of the ingredients of disintegrated granite rocks ; or indirectly, by the repeated destruction of different classes of stratified rocks, the materials of which had, by prior operations, been derived from unstratified formations."—*Buckland.*

"In mountainous countries many facts are presented to the eye which approach to a standard of measurement of the average action of the atmosphere and of running water, in decomposing and washing off the surface of granitic and basaltic rocks. That action is sure and constant ; but it is slow, to such

a degree that not years but centuries are required for its chronicle. Even the abrading of that description of rocks where they form the boldest sea-coast, by the violence of storms added to the ordinary action of water and weather, (an addition of great power,) has not materially altered the outline of such shores in Cornwall, the west and north of Scotland, Norway, and many other countries, since the beginning of our historical knowledge. But the action of a fresh water river infringing upon hard rocks, is much more feeble."—*Smith*.

"Every step we take in it [geology] forces us to make unlimited drafts on antiquity."—*Scrope, in Smith*.

"The detritus of the first dry lands, being drifted into the sea, and there spread out into extensive beds of mud, and sand, and gravel, would for ever have remained beneath the surface of the water, had not other forces been subsequently employed to raise them into dry land. These forces appear to have

been the same expansive powers of heat and vapour, which, having caused the elevation of the first raised portions of the fundamental crystalline rocks, continued their energies through all succeeding geological epochs, and still exert them in producing the phenomena of active volcanoes."—*Buckland*.

"All observers admit that the strata were formed beneath the water, and have subsequently been converted into dry land."—*Ibid*.

"The first appearance of stratification is in the rock called Gneiss. This is composed of the same materials as granite, on the irregular outline of which it rests. Over the Gneiss, come the beds of Mica, Shist, and Slates, whose thickness, 'like that of the Gneiss, cannot be ascertained, on account of the intervention of other rocks.' Their mode of formation is proved by the most striking characters to have been the same as that of the Gneiss. If we should venture to estimate the united thickness of this class, added to the Gneissic, at three or even four miles, we

could not be charged with exaggeration."—*Smith.*

"The thickness of these strata we know to be enormous. These depths are discovered by geological observations and inferences—that they extend to many miles was also proved. We have every reason to know from what is taking place on our own earth, that the accumulation of materials at the bottom of the ocean, is a work *infinitely slow*. We are sure that such an accumulation as should produce the primary strata, as we now see them, must have occupied a space, from the contemplation of which the mind shrinks."—*McCulloch, as quoted by Smith.*

"Of the next group, the "siliceous, slaty, and limestone aggregates, to which the name *silurian system* is given,—the united thickness is about a mile and a half. Who then can calculate the periods of their derivation from the older formations, their deposition, their elevations, and distortions; their convulsions, penetrations, and alterations of the

adjoining rocks, by *frequent* outbursts from the fiery liquid below, and other movements, till they were brought to their existing condition. It would seem perfectly impossible for any person, but moderately acquainted with the visible phenomena of volcanic regions, to escape the impression that myriads of ages must have been occupied in the production of these formations, before the creation of man and the adaptation of the earth's surface for his abode. Evidence to the same effect would accumulate upon us to a vast amount, in examining the old red sandstone, a remarkable deposit, several thousand feet in thickness, found in some parts of Great Britain, more abundantly in Ireland, and either in resemblance, or in equivalence, in many foreign regions. Next we come to the mountain limestone, consisting almost entirely of the shells and coralline productions of sea animals, often a thousand and more feet in thickness. This formation is frequently more or less interposed among the beds of coal, composed of compressed vegetable matter, underlaid and overlaid with shales, and

sand stones in every variety, often effecting a thickness of three thousand feet. The new red sandstone, advances us about another thousand feet.

“Other changes implying probably some alteration in the disposition, and consequently the action of the fiery gulf below, marked the next great system, or series of rocks,—the Oolitic. Its general thickness can be little less than half a mile. It is filled with the most convincing proofs of deposition from sea water both shallow and deep, the mingled waters of river mouths, and perhaps even fresh water of rivers and lakes.

“We arrive, in ascending, at the great masses of chalk, and its accompaniments of peculiar clays and sands, to the thickness of a thousand feet more. Though the lines of stratification are not here so visible as in the underlying formations, the evidence of deposition from watery mixture, and of very interesting effects from molecular and chemical attractions is so clear as to be irresistible.

“Our last stage of ascent comprehends the tertiary series; a succession of beds,

clays, sands, and limes, variously intermixed, occupying a thickness of six or eight hundred feet. When we have mounted to the most recent of those later formations, immediately below the soil on which we tread, we find enormous masses of gravel and other transported materials demonstrated by their position to have been rolled along by mighty currents, subsequently to all the lower formations.

“ In those stratified rocks which are of a sandy constitution it is common to find pebbles, from the size of coriander seeds to that of birds’ eggs, and much larger. These bear demonstrative evidence of having been derived from more ancient rocks, by fracture and detachment, *long rolling on a hard bottom under water*, dispersed through the loose sand of a deposit, *subsiding to the lower part* if a tolerable free motion were permitted, and then consolidated. Let the old red sand stone be our example. In many places the upper part of this vast formation is of a closer grain, showing that it was produced by the last and finest deposits of clayey and sandy mud, tinged as the whole is, with oxides and

carbonates of iron, usually red but often of other hues. But frequently the lower portions, sometimes dispersed heaps, and sometimes the entire formation, consists of vast masses of conglomerate [pebbles with sand, &c.]

“The earliest slate rocks, like all other strata, must have been originally deposited in a position horizontal or nearly so. By subsequent movements, not one but evidently many, they have been raised to all elevations, and bent to the utmost extent of contortion : as is shown by the lines of stratification.

“The stratification contains in itself the evidence of having required periods, impossible indeed to be determined by any assignment of figures, but to which, judging from all approximating evidence, our cycles of time afford none but a totally defective measure of comparison.”—*Smith*.

“It appears that from the remotest periods there has been ever a coming in of new organic forms, and an extinction of those which pre-existed on the earth ; some species

having endured for a longer, others for a shorter time ; but none having reappeared after once dying out.”—*Lyell*.

“ General and particular results all agree in demonstrating that the physical conditions of the ancient ocean must have been very different in some respects, from what obtain at present ; and that these conditions were subject to great variation during the very long periods which elapsed in the formation of the crust of the earth. In the course of these changes, whole groups of animals perished ; others were created to perish in their turn.”—*Phillips*.

“ The former universality of the ocean [is] now disproved by the discovery of the remains of terrestrial vegetation in strata of every age, even the most ancient.”—*Lyell*.

“ In an early part of our inquiry we traced back the history of the primary rocks, which composed the first solid materials of the globe, to a probable condition of univer-

sal fusion, incompatible with the existence of any forms of organic life, and saw reason to conclude that as the crust of the globe became gradually reduced in temperature, the unstratified crystalline rocks, and stratified rocks produced by their destruction, were disposed and modified, during long periods of time, by physical forces, the same in kind with those which actually subsist, but more intense in their degree of operation ; and that the result has been to adapt our planet to become the receptacle of divers races of vegetable and animal beings, and finally to render it a fit and convenient habitation for mankind."—*Buckland*.

"In the course of our inquiry, we have found abundant proofs, both of the beginning and the end of several successive systems of animal and vegetable life ; each compelling us to refer its origin to the direct agency of creative interference."—*Ibid*.

"If geology should seem to require some little concession from the literal interpreter of

Scripture, it may fairly be held to *afford ample compensation* for this demand, by the large additions it has made *to the evidences of natural religion*, in a department where revelation was not designed to give information."—*Ibid.*

"There are good grounds for supposing that, beyond a certain thickness for the solid crust of the earth, which can hardly be estimated at so much as *thirty* miles, the next contiguous matter is in a state of fusion, at a temperature probably higher than any that man can produce by artificial means ; or any natural heat that can exist on the surface."

"All strata follow antecedent ones in an order which is certain and invariable for every region of the earth. Nowhere, however, is the entire series found. Some member or many are wanting in every assignable locality ; but they are never put in a violated order. The lower strata, manifestly the most early, are generally of the greatest extent in length and breadth, and very much the deepest in thickness. The higher and newer are seve-

rally of less magnitude in every dimension. Yet, in no case, must the idea of size or extent be taken upon a trifling scale. Even with the most recent, the area of one formation is often some hundreds of square miles."—*Smith.*

"There are thirty, or rather more, well defined *beds, layers, or strata, of different mineral masses, (different in mineral composition,) lying upon each other, so as to form the surface of the globe on which we dwell. These combine themselves, by natural characters, into three or four grand groups. Compare them to a set of books, in thirty or forty volumes, piled up on their flat sides. They are placed one over the other, in a sure and known order of succession; that is, though in every locality some are wanting, the order of position is never violated.*"—*Ibid.*

"In the older fossiliferous rocks, animal life appears in as full a development with respect to *size*, as in the existing analogous animals. It does not appear that animal life, at

that period, was limited with respect to number. The lower silurian rocks are crowded, in some localities, with organic bodies ; and their absence over extensive districts is only a condition in the distribution of testacea, &c. which prevails in our seas."—*Ibid.*

" In the superficial gravel containing rolled blocks of stone, coming from vast distances, we find bones of the elephant, rhinoceros, &c. of *extinct* species, mingled with bones of mammals of *known* species."—*Ibid.*

" The sources from which the matter of these ejected [volcanic] rocks ascend, are deeply seated beneath the granite ; but it is not yet decided whether the immediate causes of an eruption be the access of water to local accumulations of the metalloid bases of the earths and alkalies ; or whether lava be derived directly from that general mass of incandescent elements, which may probably exist at a depth of about one hundred miles beneath the surface of our planet. The intrusion both of dykes and irregular beds of

unstratified crystalline matter, into rocks of every age and every formation, all proceeding upwards from an unknown depth, and often accumulated into vast masses, overlying the surface of stratified rocks, are phenomena co-extensive with the globe. Each individual movement [of the volcanic forces] has contributed its share towards the final object; of conducting the molten materials of an uninhabitable planet, through long successions of change and of convulsive movements, to a tranquil state of equilibrium ; in which it has become the convenient and delightful habitation of man, and of the multitudes of terrestrial creatures that are his fellow tenants of its actual surface."—*Buckland*.

"It is from the more ancient coal deposits that the most extraordinary evidence has been supplied in proof of the former existence of an extremely hot climate in those latitudes which are now the temperate and colder regions of the globe. It appears from the fossils of the carboniferous period, that the flora [contained] tree ferns, or plants allied to

them, from forty to fifty feet in height ; and arborescent lycopodiaceæ, from sixty to seventy feet high. Of the above classes of vegetables, the species are all small at present in cold climates ;--their development even in the hottest parts of the globe, is now inferior to that indicated by the petrified forms of the coal formation. In regard to the geographical extent of the ancient vegetation, it was not confined, says M. Brongniart, to a small space, as to Europe for example ; for the same forms are met with again at great distances. Thus the coal plants of North America are, for the most part, identical with those of Europe, and all belong to the same genera. The uninjured corals and chambered univalves of Melville Island [lat. 75°] and other high latitudes, sufficiently prove that, during the carboniferous period, there was an elevated temperature, even in northern regions bordering on the Arctic circle. The heat and humidity of the air, and the uniformity of climate, appear to have been most remarkable when the oldest strata hitherto discovered were formed. The approximation

to a climate similar to that now enjoyed in these latitudes, does not commence till the era of the formations termed *tertiary*; and while the different tertiary rocks were deposited in succession, the temperature seems to have been still farther lowered, *and to have continued to diminish gradually, even after the appearance upon the earth of a great portion of the existing species.*"—Lyell.

"The upper bed of rock salt in Cheshire is twenty-six yards thick, and is separated from the lower bed of salt by a stratum of argillaceous stone ten yards thick. The lower salt has been penetrated forty yards. In another part of Cheshire three beds of rock salt have been found. The uppermost is four feet thick, the second twelve, and the lower has been penetrated twenty-five yards, but is not cut through. The rock salt at Cardona, in Spain, is 663 feet in height. Hungary and Poland afford the most numerous and extensive repositories of rock salt in Europe. The beds are inclined at an angle of 40°. There is an extensive formation

stretching on each side of the Carpathian mountains for 600 miles. In the lofty deserts of Caramania in Asia,—in Great Tartary, Thibet, and Indostan, this mineral is also found. In the elevated mountains of Peru, it is said to occur at the height of 9000 feet above the level of the sea. In the desert of Lybia there is an extensive bed; and it is found in South Africa, New South Wales, and in various islands.”—*Bakewell*.

“Taken as an illustration of the structure of the crust of our globe, the successive coats of an onion, if they were of different colours, might not unaptly represent the different strata that cover certain districts. The different strata which occur under each other, are not arranged in the order of their density or specific gravity. Coal strata, for instance, are often covered with strata of iron stone, the specific gravity of which is more than twice that of coal. *Primitive rocks* were so called because no fossil remains of animals or vegetables, nor any fragments of other rocks, were found imbedded in them. Those

rocks generally occur in immense masses or beds ; they form the lowest part of the earth's surface with which we are acquainted, and constitute the foundation on which rocks of the other classes are laid. The rocks which immediately cover them contain, almost exclusively, the organic remains of the lowest class of animals. The lower series of *secondary rocks* are almost all distinctly stratified. Every regular stratum in which organic remains are disseminated, was once the uppermost rock, however deep it may be below the present surface. If it had been predicted a century ago, that a volume would be discovered, containing the natural history of the earliest inhabitants of the globe, which flourished and perished before the creation of man, what curiosity would have been excited to see this wonderful volume ; how anxiously would philosophers have waited for the discovery ! But this volume is now discovered ; it is the volume of nature, rich with the spoils of primeval ages, unfolded to the view of the attentive observer, in the strata that compose the crust of the globe. Some of the more

delicately constructed animals, and the fish whose bodies are found entire, imbedded in stone, appear to have been instantaneously destroyed and enveloped in mineral matter, before the putrefactive process could commence. Stratified rocks are composed of layers of stone, laid over each other, and divided by parallel seams like the leaves of a closed book. In these seams or partings, which divide the strata, there are frequently thin laminæ of soft earthy matter ; but sometimes the surfaces of the upper and lower stratum are so closely joined that it requires a considerable force to separate them. The highest known point at which granite has been observed, in any part of the world, is Mont Blanc—15,680 feet above the level of the sea. In the northern or Swiss Alps, granite is seen only near their bases ; the summits are composed of immense beds of stratified rocks. In the extensive range of the Andes, granite has not been found in a greater elevation than 11,500 feet. The summits of the Himmaleh mountains are believed to be composed of secondary strata. Though

granite may be regarded as the lowest known rock formation, yet it is certain, that in many countries, the seat of volcanic fire is placed below granite. All rocks under the coal formation, belong either to the transition or primary class ; and all the strata above the coal formation belong either to the upper, secondary, or the tertiary class. The different strata under a bed of coal are frequently similar to the strata over it ; and the same series is again repeated under the lower beds of coal, and sometimes with a perfect similarity both in the succession and thickness of each. The thickness of the coal strata in the same coal-field often varies from a few inches to several yards ; but each stratum generally preserves the same thickness throughout its whole extent. A dyke is a wall of mineral matter cutting through the strata in a position nearly vertical. The great coal formation appears to be confined to the lower secondary strata, generally resting on transition limestone. A remarkable coal formation occurs in Switzerland at the depth of 280 feet from the surface ; over the

coal there is a stratum of bituminous limestone, containing fluviatile shells, and bones and teeth of the large mammalia, particularly the teeth of a species of mastodon. Were it not for the organic remains in different rocks, we could not be certain that all rock formations were not contemporaneous. With respect to the identity of age, or what is pedantically named the synchronism of rock formations in distant countries, there can be little hesitation in admitting it, where the association with other rock formations is similar in both countries. The disintegration of rocks and mountains is constantly taking place by the incessant operation of the elements."—*Bakewell*.

The following Geological doctrines are derived from the preceding extracts, and others elsewhere inserted, and from other passages in the writings of the same authors.

1. That the globe was at first in a state of igneous fluidity; and that the process by which its surface became cooled resulted in

the formation of a crust of granite or crystalline rocks.

2. That the surfaces of these rocks were, by the combined action of air and water, worn down and floated from higher to lower levels in running water, and deposited at the bottom of seas, lakes, &c. in layers, beds, or strata.

3. That these strata, though differing widely from each other in their composition, are respectively formed of homogeneous materials, and in an order of succession which is uniform; that the lower members of the series are much thicker, and occupy areas of larger extent, than those above them, and especially those nearest the present surface; and that they were deposited in a position horizontal or nearly so.

4. That the entire series of stratified formations was effected by the slow and gradual operations of those second causes, mechanical and chemical, which are at present producing analogous results; and that the process occupied inconceivable periods of duration.

5. That when by this process, and by the elevation of the deposits formed under seas, or otherwise, portions of dry land appeared, certain plants and animals were created to occupy them ; and subsequently, from time to time, new creations of organic beings, terrestrial and marine, took place. That the remains of many of the plants and animals, which were created and flourished successively at different periods, were buried in the slow process by which the successive stratifications were formed, and are now discovered in a fossil state ; and that the strata were subsequently upheaved by forces from below, to various degrees of inclination and elevation.

6. That the object of the stratifications, and other changes referred to, was to improve the condition of the earth, and fit it to be the abode of man.

7. That after the complement of geological changes had been effected, and the stratified series ended, the whole was thrown into a state of chaos or confusion, darkness and ruin ; and was reconstructed and arranged so

as to be fit for the reception of man, conformably to the account of the "six days" operations recorded by Moses. [Held by those who desire to show that their theory is consistent with the Mosaic account.]

8. That in the progress of those changes, or at some period, the climate both of the northern and southern hemisphere, and especially of the polar regions, was changed from a state of tropical heat and productiveness, to a state of extreme coldness and sterility.

9. That since the date of the creation, as recorded by Moses, the same mechanical and chemical causes which operated the preceding geological changes, have been at work, but have produced but slight effects, at least within the last 3000 years.

10. That the result of the whole is, that the state of the earth is, and has been, since the date of the Mosaic creation, peculiarly fitted to be the residence, and to subserve the comfort and happiness of man.

CHAPTER V.

The theory involved in the foregoing doctrines and opinions of Geologists, is liable to numerous objections other than those derived from the sacred writings.

1. None of the processes which belong to this theory appear to provide, or in any manner to account for the production of, the waters of the ocean. These waters have an average depth of several miles. They cover about two-thirds of the superficial area of the globe. Their contents, in cubic feet, as compared with those of the entire mass of stratified rocks, may perhaps be as three or four to one. In treating of the "crust," or superficial matter of the globe, therefore, they would seem to be entitled to very particular attention; and in the Scripture account of the creation, they are clearly and amply provided for. The geological writers, however, speak of them only as if they existed as a matter of course, and give no account or explanation whatever of their origin, formation, or character, in any respect.

Now let the reader imagine that the globe was originally in a state of igneous fluidity, and that the outer surface cooled down and formed a shell or crust of granite or crystalline rock fifty or a hundred miles in thickness; and then conceive, if he can, whence this indurated surface was furnished with such a mass of salt water, or with a single drop of it. It could not, while the crust was cooling and hardening, have passed off in vapour into the atmosphere, for that would not hold enough to be taken into the account in estimating its quantity, nor any at all in a saline state; and if any process of exhalation from the heated mass below took place, and was repeated ever so many times while the surface was cooling; and did not evaporate as fast as it fell, how, when precipitated in rain, did it become salt?

There can be little hazard in saying that, upon this geological theory, it is impossible to give any account of the origin or manner of producing this copious element. The decomposition of granite would yield neither water nor salt; and if water did not exist,

both in the seas and in rivers, at the commencement of the sedimentary deposits, there could have been no detritus washed down and deposited. In a word, if it was not created at the same time with the solid parts of the earth, separated from those parts and gathered into seas, according to the Scripture representation, we must be content to remain in total ignorance of its origin.

2. The theory is equally deficient in respect to the origin or production of the atmosphere; the existence of which is in like manner taken for granted, without so much as a word of explanation. The eyes of the geologists would seem to have been constantly turned downwards, and so intently fixed on the phenomena of imbedded rocks and bones, as to take no further notice of the two principal instruments of those phenomena than to assume their presence and agency to the utmost extent required by their hypotheses. If their theory is true, some explanation is at least desirable. If the material of the globe was originally thrown off from some nebular mass, and commenced its revolutions in a state of

igneous fluidity, a state of the most intense heat, it occurs to ask, whether it brought its atmosphere with it? Whether such an atmosphere could endure and co-exist with such an incandescent mass in the midst of it? Or whether it was formed gradually by those second causes which are still at work, and by which all other changes are alleged to have been produced? And if so formed, is its volume still increasing? Was it, as gradually formed, endued with all its present properties, or has it been perfected by slow degrees by the same causes, and in connection with the changes which are alleged to have improved the constitution and condition of the earth?

3. It being thus apparent that the two elements by which, in the course of all but infinite periods of duration, the original crystalline rocks are supposed to have been decomposed, and their detritus to have been transported and deposited in the strata which now exist, are, as to their origin or mode of production, wholly overlooked by the Geologists, being neither accounted for, nor any room left

to conceive how they came into being ; it becomes necessary in proceeding with their theory to do as they do, take it for granted that the ocean and the atmosphere were present to perform the functions assigned to them.

The next most obvious inquiry then, relates to the origin or production of the quantity and variety of materials which compose the stratified portion of the earth's crust. The theory teaches that these materials were derived from the granite or crystalline rock which constituted the solid surface prior to the commencement of the sedimentary or stratified formations. That rock we are told was, by exposure to the atmosphere and to the action of water, gradually, though the process was inconceivably slow, worn down, transported over the beds of the ancient seas, and there spread out and deposited in layers of mud, sand, and gravel.

Now it is apparent that if such a process took place, it would naturally prevail simultaneously all over the globe ; the rocks which rose above the surface of the seas being every where alike exposed to the atmosphere, and

the ocean beds being every where alike capable of receiving the detritus. The stratum first deposited would therefore be co-extensive with the depressed portions of the original granite surface, leaving the more elevated portions, those which extended above the surface level of the sea, and the mountain ridges, still exposed. After the deposit of the first stratum, therefore, or the formation of the lowest portion of it to the depth of a few inches, the only resource left for the supply of materials for the remainder of that stratum and for all the formations above it, was those granitic surfaces which still appeared above the sea level. Now the entire series of sedimentary formations is estimated by some to be about five miles, and by others more, up to ten miles in thickness. They were extended, especially the lower beds, comprising three to four-fifths of the depth of the whole mass, over a very large proportion, perhaps three-fourths of the area of the present continents and islands. To what extent or depth they prevail over the area occupied by the present seas, must be matter of conjecture. But

enough is known to render it safe to say, that the geologists may exhaust the vocabulary of their own and other languages in representing to us how the primitive rocks were worn down and transported as it were atom by atom, and spread out over areas thousands of miles square in continuous and homogeneous beds, till masses miles in thickness were accumulated : but when they have explained the process, and confirmed it by their construction of geological facts, and assigned to it ages and periods of duration which words cannot even faintly indicate, the supply of materials for these vast formations, unless the lowest part of the first stratum be excepted, will remain as entirely unaccounted for, on their theory, as are the atmosphere and the waters of the ocean. For no further supply of matter could be derived from the surfaces covered by the earliest deposit, and so far as there is any evidence from geology or from any other source, those primitive rocks which were originally elevated above the sea level, and exposed to the action of air and water, and which remain so to the present day, co-

vered or flanked by the earliest and lowest of the sedimentary deposits, have parted only with portions of their materials too insignificant to be mentioned in an account of the stratified masses. And as to the breaking up by inundations, river currents or otherwise, of strata or portions of strata previously deposited, sweeping over extensive tracts technically called valleys of denudation, or excavating channels and gorges, and drifting their materials into the ocean, it is apparent that such operations could add nothing to the general mass of sedimentary matter, any more than rain adds to the general mass of water. The resource for materials which this theory commends to us, would seem therefore to exist only in imagination. All we can say is, that the materials were necessary to the theory, and therefore the supply, as in the case of air and water, was taken for granted.

4. Passing by, for the present, several obvious considerations respecting the diverse character of the matter which enters into the composition of different strata, the homogeneity generally of the materials in each

of the formations, respectively, the distribution of fossil relics, &c. in order to bring into view that part of the geological theory which relates to the antiquity of the earth, or the lapse of time required by the inconceivably slow progress of the sedimentary deposits, it occurs to observe that the present position and condition of the stratified masses strongly indicate that their formation could not have occupied any such prolonged periods ; or any more than a very brief period. This is rendered highly probable by the fact that since their formation, their position has been generally, perhaps universally altered from their original level to various degrees of elevation and inclination. It is allowed that they were formed in a horizontal position, by subsidence in water. The supposition that their formation occupied millions of millions of years, requires it to be supposed that the forces by which their position was afterwards changed, remained dormant during those countless periods : which, at least on the geological theory, is to the last degree improbable ; for that theory ascribes both the strata and their

changed position to the gradual operation of the causes which are still producing analogous effects, of which that of change of position is one.

It will not do to suppose that the lower strata of the series which are now in an inclined position, to which frequently at least the higher strata are conformed, were raised before the entire series was deposited; for if they had been, the superior strata could not possibly have been so deposited on the sloping surfaces as to have occupied a conformable position and been of the like thickness, as they often are, in the highest as in the lower parts.

It is therefore highly probable, not to say certain, that the series must have been deposited within a period so brief as to have been exempt from the disturbing forces which were afterwards so largely, and which still are to some extent in operation. This probability is strengthened and confirmed by all that is advanced by the geological writers respecting the action of those forces upon the crystalline rocks, whether before or since the formation

of the sedimentary series, and whether in elevating mountain ridges or forming veins, dykes, faults, or other changes ; since all this implies that these forces were never long at rest.

From what has hitherto been discovered it appears to be justly inferred, that the process of stratification, at the earliest as well as at subsequent stages, was simultaneous in the different regions of the globe. The several members of the series are in different countries found in their appropriate position with relation to each other ; and each stratum bears a character sufficiently uniform, wherever portions of it are observed, to afford satisfactory evidence of its simultaneous origin. It is therefore enough for this argument, if the series has in any one locality, as on the Eastern Alps for example, been thrown into an inclined position. For if the disturbing forces were at rest during the period occupied in the formation of the series in that locality, they were at rest during the contemporaneous formations every where else.

The probability that these rocks were form-

ed within a period of no great extent, is in like manner to be inferred from the fact, that the dykes and veins of mineral and metallic matter by which in numberless instances they are intersected, extend up out of the underlying granite through the series ; perforating what are, with no great reason, except for the convenience of classification, distinguished as the transition, secondary and tertiary groups ; and often depositing their surplus matter on the upper surface. Now these dykes and veins have beyond all question been interposed since the process of stratification was completed ; and therefore if that process occupied myriads of ages, or even one age, the forces by which these injected masses were thrust up, must, during such period, have lain dormant. For no geologist will pretend that they rose gradually, keeping pace with a slow and gradual formation of the strata. Their origin, their nature, their present position, and every consideration respecting them, forbids such a supposition ; and equally forbids the supposition that the mighty forces which thrust them up remained quiet during a protracted period

of great and universal change in other respects.

It may be noted in further confirmation of this view, that the dykes and veins which pass through distorted or inclined strata, maintain a direction not often conformable to, nor at right angles with, such strata, but a direction, generally, at right angles with the horizon, or nearly so.

5. The argument, founded on the differences observed between the fossil remains of the inferior and those of the higher strata, from which the geologists infer that long periods of time must have intervened between the completion of one and the formation of another stratum, is founded on the conviction, common to all the geological writers, that the fossil relics contained in the respective strata, belonged to organic beings which lived and died on or near the places where they were deposited ; and requires it to be assumed that when the formation of a stratum, of whatever extent, was completed, the process was suspended during a period long enough to permit the accumulation of a depth of soil on that

stratum, and the creation, growth and maturity of new races, or of a new stock of plants and animals, preparatory to the commencement and due composition of another stratum.

Now had such been the course of things it would have been impossible for any one of the strata containing fossil remains, to have been so formed as to have distributed and left these remains in the positions in which they are now found. For suppose a stratum formed by such renewed process to be a thousand or more feet in thickness, and to contain fossil relics both of marine and terrestrial plants and animals distributed irregularly from top to bottom ; and it must be apparent that the lower portion of such formation could not possibly become stratified by the agency of water, without imbedding the supposed soil with all its plants and animals, from which by the theory the superior portions ought to be supplied with relics. If it be supposed that the soil itself attained the thickness of a thousand feet before any plants or animals were created on it, then the whole mass must have been dissolved in water and deposited at once

and not gradually, to account for the diffusion of the fossil remains. And if it be supposed that a gradual accumulation of soil took place and afforded the necessary support to organic beings, and that the process of stratification and inhumation of relics was constantly going on at the surface, it is obvious that this would preclude the presence and agency over the field of deposit of the water which was indispensable to the intermixture of marine relics, and for other reasons ; and also that in some of the strata, as of lime for example, such a course of operations would be impossible for the like, and for other and quite different reasons.

The facts therefore which are stated by geological writers respecting the distribution of land and marine plants and animals, of different characters, orders, or species, are irreconcilable with their theory of gradual stratification ; and no less inconsistent with their inferences from the different varieties and conditions of fossils found at different depths or in different beds of the series, of which the lowest group as well as those above, contains

a mixture of fossil trees and other products of dry land, with the remains of marine plants and animals. The construction which they put upon this portion of the hieroglyphics of their book must therefore be incorrect. It must be concluded that they teach nothing certain as to the lapse of ages, new creations, and the like. Accordingly, when the attention of a geological writer is turned another way, we read as follows : " We find *certain families* of organic remains *pervading* strata of every age, under nearly the same generic forms, which they present *among existing* organizations." " It is indèed true that animals and vegetables of the lower class prevailed chiefly at the commencement of organic life, but they did not prevail exclusively." *Buckland.*

6. The geologists, to reconcile the theory of interminable ages occupied in the gradual formation of sedimentary deposits, with the existence in high northern latitudes of the fossil remains of tropical plants and animals, are stumbled at the great change of climate which has taken place. Mr. Lyell

treats largely of this subject, though the change seems plainly inconsistent with his ultra theory that all geological changes have resulted from the uniform and gradual operation of those second causes which are still at work, for no such process appears to have been going on within the last three thousand years ; and is alike in conflict with the theory of those who hold that the operations of second causes during the great geological period were designed to improve and render more perfect the condition and adaptations of the earth ; for this extreme change of climate cannot be regarded as having had any such tendency. It being ascertained beyond all question, however, that the remains both of tropical plants and animals exist abundantly in a fossil state in the arctic regions, and especially plants larger in size and of more exuberant growth than those now produced within the tropics, and in comparison with which those of cold climates are but insignificant weeds ; and it being clear that they never could have floated from the tropics to the polar regions, it was necessary to admit

such a change as would be consistent with their having been produced on or near the places where they are deposited. In view of the facts the change is evident enough ; but why and in what manner was it effected ? It surely was not designed to improve the condition of the earth ; and on the theory under consideration there could have been no moral reason for it millions of ages prior to the creation of man ; nor could it have been effected by the gradual operation of second causes, unless they ceased to operate many centuries ago. Great as the revolution was, from torrid heat and extreme fertility to frost and barrenness, it occurred for no conceivable reason, and in no conceivable manner, so far as the geologists are able to inform us. They adduce a variety of facts and considerations respecting the plants, the animals and even the rocks of the arctic regions, to show the reality and greatness of the transition ; and leave no room to question its having been the greatest change that has ever yet taken place on the earth, in respect to its adaptations to the production and support of plants and

animals, and to the occupancy and accommodation of man ; but the occasion and manner of it are not disclosed in the pages of the geological book. In place of any satisfactory or probable reason or occasion, we are entertained with comparisons of the fossil remains of the northern regions with existing species of plants and animals of the south, so far as they are identical, and speculations on the connection between climate and the distribution of land and sea, on fluctuations in the physical geography of the earth, on the laws which regulate the diffusion of heat over the globe, and every variety of suggestions and conjectures as to what might have produced some effect, or contributed something to the change of climate : with respect to all which it is safe to say, that if these real or imagined causes might produce a change in any degree from hot to cold, so they might from cold to hot, and were quite as likely to work one way as the other. If they might lower the temperature of the north, they might render that of the tropics too hot for the existence of organic beings.

If they might in the course of one cycle of ages convert the arctic regions from a state of equatorial warmth to a state of congelation, they might in another cycle convert them back : and indeed the hint is not suppressed that such alternations may have occurred or be yet in store.

But how did it happen that the second causes which are still in operation, and are alleged to have some local effect, lowering the temperature in course of time at some points, and raising it at others, operated in the great change in question only by way of lowering the temperature throughout the whole of the northern hemisphere, and the southern too, simultaneously ? It does not appear, and is not pretended that the change commenced any where till after the rocks termed secondary were deposited, nor is any evidence adduced to show that it commenced prior to the formation of all those called tertiary. In either case its cause would seem to have operated universally, and its progress to have been by far too rapid to be accounted for by any of

the operations connected with other physical changes.

“But if,” says Mr. Lyell, “instead of forming vague conjectures as to what might have been the state of the planet at the era of its creation, we fix our thoughts on the connection at present existing between climate and the distribution of land and sea, and then consider what influence former fluctuations in the physical geography of the earth must have had on superficial temperature, we may perhaps approximate to a true theory. If doubts and obscurities still remain, they should be ascribed to our limited acquaintance with the laws of nature, not to revolutions in her economy.”

Now this may satisfy one who is already immoveably fixed in the belief that the earth has existed throughout all but infinite duration, and that all the changes it has undergone have been effected by the ordinary and uniform operation of the second causes which are still in progress; but to ascribe this change of climate to those causes, though it may be the best, and all that can be said on the geo-

logical theory, is mere trifling. Those causes if they had any effect, besides being likely to have had as much influence one way as the other, so as to occasion no change whatever in the general temperature, any more than they do at present, or have done for 3000 years past, are as unadapted, and as inadequate to produce results like those in question, so universal, so permanent, so mighty in all their relations to organic beings, to the condition of the earth itself, and to the second causes by which it is affected, as inert matter is to produce all the phenomena of motion, and of animal and vegetable life. The doubts and obscurities which remain are such as a more extended knowledge of the laws of nature can never clear up, unless new laws by which effects would be vast in proportion to the smallness of their causes, should be discovered. Many of the particular facts cited in support of the hypothesis under consideration, or as capable of having some relation to it, or of being the ground of some analogy, are as insignificant in comparison with the result to be accounted for, as a grain of sand

in comparison with the globe, and is little likely to have had any effect, as the boiling of a tea-kettle would be to raise the temperature of the ocean.

The difficulty will not be removed or diminished by supposing that the more than tropical warmth of the high northern latitudes was owing to the internal heat of those regions. For if a sufficient degree of internal heat existed only up to the commencement of the tertiary series, that is, to within some six or eight hundred feet of the upper surface of that series, how can it be conceived that the fossil remains four or five or more miles lower down, should not have been obliterated by its intensity? And if changes in the geographical distribution of land and water, or any other changes during the tertiary formations had the effect to lower the temperature where they took place, how should it happen that those primitive regions which were never covered by any sedimentary deposits, and those stratified regions in which the tertiary group is wanting, should have wholly lost the benefit of the previously superabundant heat from

below, and become even colder than the highest tertiary strata? Are not the former nearer to the igneous gulf than the latter? "Did the tertiary formations interpose no hindrance to the upward tendency of the heat? Was the heat such as to penetrate the crystalline foundation, and the masses of transition and secondary rocks, causing a high temperature at the surface and in the air; and did such intense heat continue to ascend during four-fifths or more of the periods occupied by the entire process of stratification, and yet subside, become imperceptible, and give place to extreme cold, on those surfaces which were never covered by sediment, as soon as on those which were so covered? And if the ascending heat was so intense during these countless ages, as to extend its influence through the sedimentary masses, why should not the seas from their lowest depths to the surface have been in a boiling state? And why, if the internal heat continues, should they not, at the present time, grow warmer as you descend, and be at certain levels in a state of ebullition, and at the lowest points in a state of incandescence heat?

CHAPTER VI.

The gradual formation of the stratified masses, is inferred from their magnitude. The geologist standing on the platform of granite in front of a cross section of these masses, rising perpendicularly before him, to the height of five or ten miles, is overwhelmed by the vastness of the object. Under the influence of his physical studies and associations, he contemplates it as the result of ordinary natural causes. As he explores the several strata with their imbedded fossils, he is relieved by adopting the grand idea of their antiquity and mode of formation. He becomes fascinated, and finds it exhilarating and delightful to conceive and talk of operations carried on through interminable periods. He proceeds to classify them, distributes them into groups and periods, and thus builds up a scaffolding to sustain the frame work of his system. At length he becomes assured and confident. He takes the geological world as his own peculiar domain, and feels associated and familiarized with it. The remotest con-

ceivable epochs seem to disclose to him their history in legible characters, for the right interpretation of which they furnish him the proper clue. In the light of this novel and sublime history, the prevalent opinions derived from the cosmogony of Scripture, appear to him to be puerile and absurd. A world not more than six thousand years old seems scarcely entitled to anything better than contempt.

Now the geologist does not and cannot possibly know what condition the materials of the sedimentary rocks were in, prior to the process of stratification. If that process commenced after the fall of man, and if those materials existed in such a state as to be rapidly moved by the causes which were brought to act upon them, then the formation of the strata would not require a prolonged period. If at the creation those materials were so combined and disposed as to provide spontaneously for the growth and support of the greatest possible exuberance of plants and animals; if, peradventure, the waters when first gathered into seas occupied no more than

one-third or one-fourth part of the surface of the globe, instead of two-thirds as at present; if the prolific soil of the remainder was during the first centuries stocked with all the variety of plants and animals, and the seas with the teeming myriads of which the fossil remains give note; if, in consequence of the apostacy, it was requisite that a new and far different combination and arrangement of those materials should take place, by which the soil should become comparatively sterile, and spontaneously productive rather of noxious than of useful plants, rendering labour, art, and the use of metals necessary on the part of man, and forbidding the continued existence of the plants and animals which have become extinct: if such were the course of things, which the Scriptures more than permit, then may we conclude that causes adequate to the effects produced, and to the rapid accomplishment of the changes, were brought into operation.

Without proposing or intending any formal theory of second causes or modes of operation, it may be proper to say that such a

course of things, while it would comport with the historical and the moral inculcations of the Bible, and perhaps may claim to be required by them, would provide for the exigencies of the case. It would provide for the animals whose relics are inhumed, and for the extirpation of those not needful to man. It would provide for the vegetable growths which furnished materials for the fossil flora and for the coal formation. It would provide for those consequences of the apostacy of man, which, conformably to the intimations of the inspired record, are actually realized in his temporal condition, his shortened life, his subjection to toil and privation.

What, in such a course of things, might have been the progress of change during the fifteen hundred years which preceded the deluge, need not be guessed. That catastrophe is set forth in Scripture in such terms as to allow the supposition of its having had much to do with the process; and the fact that the life of man was not shortened till the era of its occurrence, may be considered as strongly indicating that the same was the

principal era of the physical changes which have taken place.

Now whether such a course of things does not better comport with the theology and history vouchsafed to us in the Bible, with the great object of the creation, and the nature and penal consequences of the fall, as there set forth, and with the predicted renovation of the earth when those consequences shall have been superseded, than any theory which antedates the creation by incalculable periods, and accounts for the changes in question by natural causes, without reference to man or to the consequences of his apostacy, the reader must judge.

It cannot be said that there is any thing extravagant or improbable in supposing such a course of things. For it is in harmony with what the Scriptures teach, to affirm that the earth as originally created was as perfect in its kind, as man or any of the creatures formed to occupy it in a state of innocence and enjoyment ; perfect for the perennial and happy abode of man in his original character ; perfect in the nature and combination of

the materials of its surface, for the spontaneous and boundless production and support of plants and animals ; perfect in all its conditions and adaptations, its temperature, its climates, its atmosphere, its freedom from every thing noxious, every thing tending to disease and dissolution.

It surely will not be denied that the character of man in his primeval state, his relations to the lower animals, his physical circumstances, the career assigned to him in case of his obedience, the completeness, the harmony, the bliss of the entire scene, required a far different state of the earth, of the materials which compose its surface, of its climates, its atmosphere, and its products as to their quality, spontaneity and abundance, from that which now exists ; far different, indeed, from the conditions and adaptations, which it is in the nature of geological changes, however long continued, to produce ; far different from any thing indicated in that reconstruction and fitting up, and subjection to a continued and ceaseless process of change, which the geologists inform us of. That

primeval epoch and condition of man assuredly implies a state of the earth which needed no improvement, no progressive course of physical changes, no geological processes to perfect its adaptations. Can any one bring himself to think that if man had not sinned and brought upon himself misery and death ; that if he had continued holy and had consequently been exempted from all evil and confirmed in a life of perpetual innocence and blessedness, the physical conditions of the earth would be such as we find them ? That any such changes, catastrophes, cataclysms, derangements, eruptions, transitions of climate, as have taken place, would have been consistent with what his well-being required ? That it was at first and prior to his apostacy, more imperfect than it has been since, and therefore required to be improved by a perpetual course of geological changes ?

In short, is it not reasonable and safe to conclude, that if the Scripture account of the creation and fall of man is to be believed ; if man originally was holy and happy ; if he fell from that estate, and by his fall brought

death and wo into the world; the theory of the geologists as to the causes and manner of the changes which have occurred, cannot be correct.

CHAPTER VII.

The geologist beholding with the wonder and awe of a devotee, the huge masses of stratified matter, thinks only of natural causes and duration. He reasons upon these, and decides on an immeasurable antiquity, which precludes all reference to the apostacy of man as a ground or reason of the changes; and by assigning to them a prior date and accounting for them, leaves little to be accomplished by the Noachic deluge, which he therefore regards as a very gradual and harmless rising and subsidence of a greater or less quantity of water. It is after he has decided these great questions, if at all, that he inquires whether the Scripture record can be reconciled to his conclusions, or whether it must be given up, or taken as a poetical flour-

ish, an apologue, or a dramatic sketch. In this way it is that the volume which claims to be a revelation from the Creator and Ruler of the world, is cast aside as unintelligible or erroneous, while in place of it the theories and conclusions of man are set up.

Now, let any one whose regard for the divine oracles impels him to an opposite course, and who considers the fall of man, in itself, and in its consequences, and its connections with the mediatorial system, as an event of more importance beyond comparison, than any other which ever affected this world; of more importance probably than any other which ever affected the universe; an event in comparison with which, the stratifications of the earth, though they had been a thousand miles in thickness, would be but as the dust of the balance; an event with which the creation and continuance in being of the material universe can be compared only as the incidents of a scene can be compared with the realities and wonders of the scene itself; and he will read and construe the petrifications of geology in a quite different manner, a

manner which will require no rejection or suppression of any part of the sacred writings, nor any apology for them.

Let such an one take his stand by the side of the geological devotee, in view of the whole series of stratified formations, there to question the results which to the creature of a day, seeing only by the light of nature and through her inverted medium, seem materially great, stupendous, overwhelming; but which as compared with the system connected with them, the wide field of Divine operations, the works, purposes, manifestations and administration of Jehovah, are but as a mote in the sunbeam. Let him survey these formations in connection with the state of things around him, and the experience and history of his race, and will he not discern a thousand evidences, not of an improvement and fitting up, but of a degradation of the earth for fallen, guilty man, under sentence of death and condemnation, subjected to restraints, to privations, to painful discipline, to toil, disappointment, sorrow, temptation, malign influence, fear, oppression, torment?

Again, if he closely inspects these stratified masses will he not find that, for the most part, they were, when deposited, in a finely comminuted state, a state in which, when duly mixed with each other, they would constitute the most prolific soil, though utterly barren when separated as in the existing strata? Will he not perceive in the accumulation of homogeneous matter in the respective strata, distinguished as they are from each other by the condition or the nature of their materials, a necessity of supposing the separation and deposit of those diverse materials to have been rapidly effected? Will it occur to him as a likely thing that there were rocks of a character to furnish only the peculiar materials of each stratum, successively and exclusively exposed to the agents of decay during the long periods required for each formation? Will he not rather conclude that the various strata were composed of materials which previously existed not in crystalline rocks, but in such a state, whatever it may have been, as to be easily moved, and readily diffused in

the waters and acted on by chemical agencies?

Let him take a portion of a single stratum, covering an area a thousand miles square to the depth of three or four thousand feet. Let him consider it as having been formed simultaneously over the whole of that area, whatever length of time the process may have occupied. Let him consider the homogeneousness of its materials, and the necessity of supposing the co-existence of exposed primitive rocks beyond its bounds, to such an extent and of such a character as to furnish, in sufficient abundance, the required description of materials, and so situated and subjected to disintegration as to admit of the detached particles being removed to their ultimate places of deposit at about the same rate in different directions from masses not less extensive in the aggregate than this stratum. Let him suppose this process to be going on during many ages, whether co-extensively with this and other portions of the same stratum at the same time, or forming the several portions successively, would

make no difference, since the same quantity of primitive materials in the aggregate, would be required for the entire formation, and since, wherever found, it maintains its due position in relation to the other strata of the series, so that wherever portions of this occur, no other process could go on till this stratum was completed. Let him then consider how small a part of the known surface of the earth is now, and therefore was during those supposed ages, exempted from the deposit of this stratum, and what immense districts in different countries where this formation prevails, are wholly destitute of any description of unstratified rocks rising above its surface, to furnish materials for this or any of the strata above it, which required materials from such rocks more abundant in the aggregate by many times than were required for this stratum. Let him consider that while this process was going on during the formation of the successive strata in the different regions of the earth, excepting where the naked primitive rocks rose above the general level, and offered their barren

surfaces to the tardy agents of disintegration, the tribes of plants and animals whose relics now cry out from the lowest vaults of their prison house, lived and flourished in all the vigour of their prime and in all the multitude and variety of their several races. Let him consider that the necessary and constant presence of water over the fields of stratification, utterly forbids the supposition that the terrestrial portion of the plants and animals which were inhumed, lived and died on or near the places where their relics are discovered. Let him consider these things, and will he not pause and hesitate as to the account which the geologists give of this whole process? Will he not deem it more credible that the stratifications should have been formed after an ample stock of plants and animals had been provided, and formed of materials already existing in a state to be rapidly separated and moved, and by the agency of the only deluge which upon any authority is known or believed to have overspread the whole earth?

The geologists argue that there was de-

sign in the formation of the several strata of different materials ; that the separation of the metals, the limes, the coal &c. from other materials was to promote the convenience and facilitate the labours of man. But if there was design there was a designer as able when the occasion arose, to effect the needful changes in a rapid as in a slow and gradual manner ; and the operations consequent on his design, instead of affording only a feeble and doubtful argument in support of natural religion, may yield direct and signal evidence of revealed truths which are of the highest and most enduring concern to man.

Something further may need to be said as to the extent of simultaneous stratification, though the question whether the process was simultaneously co-extensive with the entire series, or even with the respective strata, or not, is of little importance as regards the theory of gradual formation ; since it prevailed in the case of every principal stratum, over fields too extensive to allow the supposition of their terrene fossils having been supplied by drift, had they existed elsewhere

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than upon those fields, and had there been water to float them. Mr. Lyell observes, "that until organic remains were minutely examined and specifically determined, it was rarely possible to prove that the series of deposits met with in one country, was not formed simultaneously with that found in another. But we are now able to determine in numerous instances, the relative dates of sedimentary rocks, in distant regions, and to show *by their organic remains*, that they were not of contemporaneous origin, but formed in succession." His proofs and illustrations, however, are founded wholly on the assumption that the deposits were formed by the gradual operation of second causes, and that the inferences made from the fossil remains of different strata are correct. Accordingly, he argues that in a group or series of strata, the lowest must be older than that next above it, and so on. To determine the relative age of any two members of the series, therefore, you have but to ascertain which of them lies immediately under the other; for the nethermost must be the oldest, since if

formed by a slow process they could not be formed simultaneously. Then as to the difference of age of the same stratum in different countries, that is to be inferred from a comparison of the organic remains of distant regions which in numerous instances no doubt may be dissimilar, and for aught that appears, may be so for other reasons than their difference of age. When pressed by the evidences of a simultaneous formation in different regions, of a stratum containing fossil remains of terrestrial plants, which obviously could have had nowhere to grow, by reason of the prevalence of water, he argues, as his theory compelled him to do, that the presence of such terrestrial plants disproved the alleged extent of simultaneous formation, and required it to be so circumscribed and situated as to permit the growth of the plants and their transportation by some other means than the submergence of their soil ; while he at the same time affirms " the discovery of the remains of terrestrial vegetation in strata of every age, even the most ancient."

Now since the remains both of terrestrial

and marine plants and animals are found in every sedimentary stratum, the theory of a gradual formation is not relieved a whit by supposing the extent of simultaneous deposit to have been more limited than the areas of the present continuous beds. For all agree that the plants and animals lived and died on or near the places where they were deposited ; those places therefore, to account for the diffusion of both classes of relics, must have been overflowed during the whole process.

There are a variety of facts and considerations treated of in the geological writings, which, though singly of little significance as to the truth of the main theory, would collectively be entitled to regard on the supposition that the theory itself was well founded. Thus the fact that no fossil remains of the human species have been found in any of the stratified formations, might, on supposition that those formations took place long prior to the creation of man, be adduced with some force in support of their alleged antiquity. But nothing conclusive can be inferred from that

fact in proof of the theory. For until the geologists shall have examined every part and parcel of those formations, they cannot be entitled to assert that they nowhere contain such remains. Their hitherto very limited inspection beneath the surface, has not discovered them ; but it does not by any means follow that they do not exist in a fossil state. And if they do not exist any where in that state, it will not conclusively follow that the fossil remains of plants and animals were deposited long prior to the creation of man. For who will venture to say that the remains of all the animals which existed during the period of the sedimentary formations, or the thousandth or ten thousandth part of them, if that period comprised millions of millions of years, are to be found in a fossil state ? In the transition and secondary groups, the remains of the highest class of vertebrated animals are rarely found ; yet the remains of terrestrial plants in those groups, show that there was at the period of their formation no want of dry land, and of means for the subsistence of such animals. " The vast diluvial

beds of gravel and clay, the upper strata in Asia, the cradle of the human race, have not yet been scientifically explored."—*Bakewell*.

It is alleged in evidence of a gradual process of deposit, that 'the lower portion of a stratum often contains pebbles, the water-worn fragments of the older rocks to which they can be traced; higher up the coarser sandstone; and towards the top the finer sediment.'—*Smith*. The argument is that the rounding of the pebbles must have required a great length of time. But on the assumption that they were drifted great distances, and by currents rapid enough to keep them in motion, wear off their ragged surfaces, give them their rounded form, and spread them over the whole area of a stratum, how came they to occupy the lower portion of it, and leave the worn off and finely comminuted particles to occupy the upper portion? It is plain that on this theory of currents the pebbles must have floated in the water over the bed of the stratum, and been precipitated, and of course they must have previously acquired their rounded form. If therefore the process was

slow, and the currents powerful enough first to abrade and form the pebbles, and then to convey them to their points of destination, which may be supposed to have been in most cases many miles, why should not those currents have carried, at the same time, quantities of the finer materials to be precipitated in the leisure of the gradual process? How can it be conceived that in such a process, continued through long periods, the finer materials should be reserved for the upper surface? If, as the theory supposes, those finer materials were comminuted by the action of water in forming the pebbles, why should not they and the pebbles have been diffused throughout the whole mass? On the other hand, it is easy to see, that if the process was sudden and rapid, the subsidence of the pebbles at the bottom, of coarse sand over them, and fine sediment at the top, would be all natural enough.

Again, the vast accumulation of minute shells, of animalculæ, infusoriæ, &c., which constitute the substance of entire formations of great extent and thickness, is referred to

as requiring the supposition of a lapse of immense periods of duration. But, surely, if their alleged fecundity be admitted, if individuals multiply at the rate of many millions, and even billions, per hour, it is easier to conceive that in a state of the waters perfectly adapted to their increase, they should, within a few centuries, accumulate to the extent indicated by their fossil remains, than that they should not, in the supposed incalculable periods of duration, have so multiplied as to fill all the spaces occupied by lakes and oceans. Moreover, the state of preservation in which these masses of shells appear to have existed at the time when they were buried by strata of different materials, appears inconsistent with the supposition of their having been very gradually accumulated. That masses of shells many feet, and even hundreds of feet, in depth, should be formed or collected by any process occupying millions of ages, with little if any intermixture of foreign materials, and with no apparent injury or decay of their most fragile parts, is far less likely than that their production and inhumation should have

occupied a period of no great extent. If the waters, prior to the Deluge, were as prolific as they may well be conceived to have been, and as the Scripture narrative would justify us in supposing, there is no more difficulty in believing that all the shells imbedded in the sedimentary formations were produced in 1500 years, than in any more extended period; and if the Deluge was the means of their inhumation, their existence and preservation in masses is far more satisfactorily accounted for than by the supposition of a gradual and prolonged process of accumulation and sepulture.

CHAPTER VIII.

A further brief illustration of the preposterous conditions required by the theory of an immeasurable antiquity and gradual formation of the stratified rocks may be allowed. That theory teaches us that the solid surface of the globe, prior to the commence-

ment of any process of sedimentary deposit, or the preparation of any materials for it, was primitive granite; from which was derived all the earthy and mineral matter now found in strata above it. But that rock does not comprise all the materials which enter into the composition of the sedimentary strata, nor any of the materials which compose some of them; and, therefore, if it had been allowed ever so long a period for disintegration, and if the whole of its superficies had been constantly exposed during such period, instead of being for the most part covered up and protected from further decay, by the earliest deposit of sediment, could not have furnished the kind of materials which were actually employed in the sedimentary formations.

It has already been observed, that after the deposit of the first stratum, or the lowest portion of it, the comparatively insignificant extent of granite surfaces which remained exposed, and which remain so to this day, could scarcely have furnished a quantity of materials worthy of being taken into account

in an estimate of the subsequent formations. Had the whole of the granitic rocks which were not covered up by the first layer of sediment, been employed in the next stage of the process, they probably would not have filled a ten thousandth part of the space occupied by the entire series. But instead of having been so used, they remain to this day substantially as they were, exhibiting but slight evidences of any diminution of their bulk ; and it may therefore be inferred with safety and with confidence, that they never furnished any of the materials of any consequence, which enter into any one of the stratified series. This only resource of the theory for matter for a gradual process continued through interminable periods, this foundation of hypothesis and assumption, is mere fancy. The materials must have existed independently of the granite as long ago as that rock itself existed ; and if they were then in being they must have rested on that primitive rock, and hindered its decay as well before as since the earliest sedimentary deposit. For if they existed in any form they must have occupied

as much room as they now do ; and if they did not occupy substantially the same space as at present, it is obvious to ask where were they heaped up and held in durance out of the way of the process by which the first and lowest stratum was formed ? Where, if excluded from the space directly over that deposit, was there room for them ? How, if they were elsewhere, were they transferred and diffused over the wide and vacant regions occupied by that first process ? Were those regions during the whole course of the formations covered with water ? If so, where was there room left for the production and growth of those land plants and animals whose relics are inhumed in the successive strata ?

But if these materials existed independently of the granite, and if they occupied substantially the same space as at present, then it is inconceivable that the lower strata could have been formed by any gradual process, or by any process at a period differing much from that of the other strata. The theory, therefore, of a gradual formation, is alike de-

fective of the materials to be deposited and of the vegetable and animal remains to be inhumed. It is the theory of an assumed process, without materials or medium for carrying it on, or any thing whatever essential to its success, but a fancied lapse of interminable periods of time.

But supposing there had been materials elsewhere than over the scene of stratification, the necessary presence of water over the whole of that scene, and in the region of the matter to be transported, in order to supply and disperse the several classes of organic remains, would preclude the growth and subsistence of those terrestrial plants and animals which are dispersed in every formation. It is no solution of the matter to suppose that the detritus of primitive rocks was drifted by rivers into the sea and there spread out in beds, even if there had been enough of such rocks piled up on the primitive surfaces which remain exposed, had that been possible, to supply the quantity of detritus required for the mass of sedimentary formations; for if there had been currents to effect such a

spreading out over millions of square miles of surface, currents flowing in all directions as they must, their action would not in the smallest degree serve to account for such a distribution of homogeneous materials, and of marine and terrestrial plants and animals, large and small, ponderous and light, as actually took place.

So in regard to the coal deposit. "It is in this formation chiefly," says Buckland, "that the remains of the plants of a former world have been preserved and converted into beds of mineral coal; having been transported to the bottom of former seas and estuaries or lakes, and buried in beds of sand and mud, which have since been changed into sandstone and shale." To this mode of accumulation some others agree. But can any one not under the deep spell of the theory concerning a former world, adopt it as affording any satisfactory, probable, or possible account of the matter? Let it be considered that this formation is found in different climates, on every continent, and in many islands, and is reasonably presumed to have taken place at

first, co-extensively with the strata, which in the order of the series, have their position beneath and over it. It is found in layers of various thickness, those of what is termed "the great coal formation," often extending over very large areas, in beds from a few feet up to thirty and even fifty feet thick. The surfaces of the beds or layers are generally as well defined as if they had been interposed in their present solid form between previously hardened sedimentary rocks. The fossil remains of this formation in the different countries and climates, are allowed to be generally and substantially identical; strongly indicating the simultaneousness of the deposit in different countries.

"The greater masses have been derived, we are taught, from trees of vast size and close contiguity, submerged in their native seats, without being removed from their place of growth, and marking their scarcely disturbed prostration by the well known impressions on the shale roofs and bottoms, of their most delicate parts, which would have been greatly

defaced or quite obliterated by even a little tossing and drifting. Detached pieces of trunks do indeed occur, whose denuded and broken state suggests a derivation from neighbouring high land, and whose forms and position prove them to have been accidental intruders ; but the idea of masses of such vegetation as compose the coal beds, having floated from different quarters, and then, which must have been of necessity, *irregularly and confusedly heaped together*, appears to be absolutely irreconcilable with the facts exhibited in the impressions of the plants upon the shale, just now mentioned.”—*Smith*.

“That any considerable part of the plants which formed the beds of coal were drifted at all, appears to be highly improbable ; that they should have been brought by equatorial currents from the regions of the tropics, is perfectly chimerical.”—*Doct. Lindley’s Fossil Flora, as quoted by Smith*.

Now whatever mode of accumulation may have prevailed, it is incredible that it should

have been gradual, occupying in any case any considerable period. It surely is incredible and inconceivable that a quantity of trees and other vegetables, sufficient to form an extensive stratum of coal thirty feet, or even five feet in thickness, should have been produced by a succession of growths on the spot where they were converted into coal; for, allowing it to be supposed that the limestone or other rock on which they were deposited, was of a nature and in a state to produce such growths, it is plain that after the first crop had come to maturity and been prostrated so as to cover the area of the formation, to the depth of one foot or less, no further growth could take place on top of them, without such a decomposition of all their parts, and such a mixture of soil with them, as is, by their fossilized state clearly shown not to have occurred. The great coal formation rests generally on transition limestone. If it be supposed that a soil of sufficient depth for the most luxuriant growth of trees and plants was first accumulated on that rock, it will not be pretended that one set or crop would fur-

nish materials for a bed of coal of any considerable thickness, certainly not fifty, thirty, or ten feet thick ; and since the coal is as pure next to the limestone as at its upper surface, and often more so, the question, what became of such soil, would admit of no answer. The trees and plants, therefore, composing such beds, which include perhaps nine-tenths of all the mineral coal yet discovered, were never gradually produced by successive growths on the areas which their materials now occupy.

To suppose that the plants of a former world, "the wreck of forests that waved upon the surface of the primeval lands, and were lodged at the bottom of the primeval waters," [Buckland] were *gradually* transported and accumulated, is no less preposterous. For, waiving all question as to where those primeval lands were situate at the era of the great coal formation, and beyond its boundaries, or what, considering the known and probable extent of that formation, must have been the extent of those ancient seas ; it is inconceivable that vegetable growths of all dimensions

should be *gradually* transported such distances as the extent of particular deposits required, and so equably diffused, with their leaves and stems generally in a state of perfect preservation; and that such a process should be slowly carried on during long periods and over wide areas, till the vast accumulations required were completed, without any considerable mixture of any other than vegetable matter. Can it be thought possible that currents various, extensive, and powerful enough to dislodge from their native positions, when in the full vigour of their growth, trees as large as those found in the coal beds, and float them the required distances, with such rapidity as to preclude the decay of their most delicate parts during the passage, and yet not carry along with them the soil in which they grew, and other earthy matter, in quantities ten times exceeding their bulk? What kind of rivers, inundations, and ocean currents must those have been, which, the moment the deposit of *transition* limestone was completed, and the materials for it exhausted, commenced their attack upon the

trees and plants of the dry land, seizing them one by one as they attained their utmost luxuriance and vigour, and arranging themselves to transport nothing but these homogeneous materials, till they were exhausted, however long the period, and to diffuse them so equably, and in such good condition, as to prevent all suspicion of mixture or of haste in the composition ?

Surely one may reasonably ask, on looking over the coal field between the Allegany and Rocky Mountains, which is known, or justly believed, to cover an area of more than a million of square miles, and in some places is more than fifty feet thick, where were the primeval lands and their required primeval forests, beyond the limits of this field, if it was covered with water during a period long enough to account for the *gradual* transportation from without, of such an extent and depth of vegetable materials ? and whence did the necessary land currents proceed ?

That there should be much respecting this formation, the manner in which it was effected, the instrumentalities employed, its relation

to the change of climate, its position in the series of deposits and the subsequent changes, the upheavals in some regions and denudation of overlying strata in others, by which it was rendered accessible to man ; that there should be much that is far beyond the ken of mere human philosophy and science, can be no matter of surprise or regret ; since that philosophy does not assign, and is wholly incompetent to discover the final cause, or any sufficient reason for its production. If this and all the other phenomena of the sedimentary formations, was not the work of blind chance ; if there was a reason for it as truly as for the creation of man and of the globe itself, that reason was as sufficient to occasion and require peculiarities of agency, operations, and results, in this, as in the cases of creating material substances and intelligent agents. We may observe and admire the phenomena, the results ; but when our philosophy, turning away, in the pride of its self-sufficiency, from the word of Him who worketh all things after the counsel of His

phenomena observed. They really mean nothing, and are nothing, more than our mode of indicating or expressing the facts, qualities, or circumstances in which the phenomena observed are perceived to agree. We call the uniformity or constancy of such agreement a *law*, as if it was the cause or reason of the phenomena. We impose upon ourselves by this high-sounding name, and by calling all that is back of it, *nature*, because we perceive nothing but the phenomena, and their coincidence or agreement. In this way the Divine efficiency may be, and often is, as truly excluded, as it would be if we should say in plain terms, that the facts, qualities, and circumstances which we observe, are their own cause.

The geologists have, as a class, one of the qualities necessary to true philosophers, a great deal of curiosity. It is, perhaps, owing in part to this that they fail in some other respects. Certain it is, that a great part of their labour consists in trying to guess what is quite beyond the sphere of their observation. They examine the earth as if it was a

machine, without discovering or suspecting that the wires by which it is moved are entirely concealed from them. Did they confine themselves to what strictly belongs to their subject as a science, all would be well. Physical science is founded wholly on observation, and is nothing more than the comparison of phenomena, and the discovery of their order of succession, and their agreement or disagreement. Within this province there is no danger of a conflict with the facts of any other subject, or with the announcements of the Sacred volume. But the geologists boldly open all the doors of speculation, hypothesis, and theory; as if the discovery of the peculiar facts of their subject, entitled them, in the name of science, to give the rein to their fancies, and to intrude even into the province of revelation. Let it be considered that in so far as they advance any thing beyond what strictly belongs to their subject as a science, we have their opinions, founded more or less on their construction of facts, and modified by their intellectual and moral character, but having no other authority than

their names may give; and we are quite at liberty to examine them, and to estimate them at what they shall appear to be worth. They may tell us that speculation is allowable in the imperfect state of their science; but the truth of the case is evinced by an observation of Mr. Dugald Stewart—that a cold-hearted philosophy has made it fashionable to omit the consideration of final causes entirely, and thus to divest the study of Nature of its most attractive charms, and to sacrifice to a false idea the moral impressions and pleasures which physical knowledge is fitted to yield.

The rules of philosophizing restrain the geologist from supposing a preternatural cause, when he can assign any other. Hence so large a part of his attention is taken up in discovering how effects might have been produced by natural causes. There is nothing in the phenomena of Geology which would not be much better accounted for, if produced rapidly by special Divine interposition, than it can be by any gradual and ordinary operation of natural causes. And all that is wanting, in any case, is the admission of a suf-

ficient reason for special or extraordinary interpositions. For, as such interpositions have undeniably taken place in relation to this world, both in the creation of it, and in various dispensations to man, there is nothing in the nature of the case to hinder them, or to render their recurrence improbable, whenever there was a reason.

But let it be distinctly noted, that if the geological theory is true, then all that belongs to the moral system must be excluded from consideration in examining the physical changes in the earth. And this, in truth, is just what the philosophers hold to. For natural causes, the laws of nature are permanent and uniform, and in their ordinary operation can produce no other than ordinary natural effects. Nothing foreign to those effects could, therefore, enter into the case. Those causes might go on in one steady course, but they could work no miracles to adapt themselves, or their operations, to the exigencies of a moral system, or the demands of moral causes. If those natural causes involve in their operations any thing of design, it must be a design

coeval with their origin and inherent in them. To talk of their being controlled and directed to any other or different end, is to talk of a miracle, as much as in the case of results contrary to, or far transcending, the power of those causes. Accordingly, when the geologists speak of design, they mean the original and general design of improving the condition of the earth, and fitting it for the convenience of man. In a word, to ascribe the changes in the earth to these natural causes, is in plain terms to exclude moral causes and special reasons altogether. On the other hand, however, if those changes are due to moral and special causes or reasons; causes wholly foreign in their nature to any thing incident to the laws of nature, there is nothing in those laws to hinder or interfere with the results. Those natural causes may be, as far as they go, in perfect harmony with the changes—all the mechanical and chemical agencies may be employed in producing them, though the changes themselves may be such, in their magnitude and rapidity of occurrence, as

those agencies, left to themselves, would never operate.

Now the earth presents to us indubitable evidence of vast and manifold changes. These the geologist refers to the gradual operation of natural causes, and assigns to them the object of improving the earth. The Scriptures bring to our view moral reasons for these changes, which reasons, however, are excluded from all connection with the changes, both by the mode in which, on the geological theory, they were produced, and by their occurrence long and long before the Scripture era. Those moral reasons, therefore, are wholly shut out and at least virtually denied. They have never had any counterpart. That which they were reasons for, and which they required, has never taken place. A curse was denounced upon the earth, but it has never been executed. The earth has been improved by the Laws of Nature, but never visited for any violation of Moral Laws.

CHAPTER IX.

The geologists treat the whole subject of the earth, its origin, its object, its condition and history, during the alleged incalculable periods, and down to the close of those physical changes which constitute the field of their research, just as they would if there were extant no records of inspiration ; just as they would, on supposition that its creation involved no moral purposes, that it was not intended as the scene of a stupendous system of moral exhibitions, agency, and government ; a scene for the trial and discipline of accountable agents, and for the most varied and wondrous manifestations on the part of their Creator ; just as they would, if there had been no sin, no penal announcements or visitations, no mediatorial interposition, no redemption achieved, or resurrection and retribution foretold.

They begin by supposing the matter of the globe to have been somehow detached from

some nebular mass, and thrust into its orbit in a state of igneous fluidity ; where, becoming subject to those laws of Nature which, in accounting for physical phenomena are an unfailing resource, it necessarily assumed an oblate form. By a course of natural processes its surface at length became partially cooled and solid, and acquired a soil. At this stage of its progress, the only uses and purposes to be subserved by it, which are indicated in the whole course of the geological period, began to be disclosed by the appearance of certain vegetables and reptiles. Successive creations, growths, and inhumations, occupied myriads of ages. If there was any intelligible design, object, or purpose in this, any discoverable or probable use or intention, it was only that of giving an existence to irrational creatures, with such enjoyment as they were capable of. There were no intelligent creatures present to witness their happiness, or to observe anything of wisdom, or of goodness, in their formation or condition. In all excepting their brute enjoyments, they existed for no higher purpose, and answered

no higher end, than the unorganized matter around them, unless the preservation of their relics, to be invoked in these last times, and made to testify against the volume of revelation, be claimed for them as a merit. They occupied, during countless ages, a mute and solitary world, which performed its ceaseless revolutions, lighted by the same sun by day, and by the same moon and stars by night, that were afterwards, when all their generations had become extinct, appointed to perform those services for man.

This scene of brute enjoyment, protracted through inconceivable rounds of duration, was not, indeed, a quiet one. Perhaps a quiet state would not have furnished sufficient of variety and excitement. Some of the geologists, accordingly, in view of the physical changes which took place, intimate, that it was a scene of terrific storms, upheavals, outbreaks, inundations, and convulsions. The surges, agitations, and explosions of the incandescent elements below; were, at times, all but sufficient to throw off into the regions of space, the restraining and suffocating crust

that had been formed upon the surface, and must occasionally have spread consternation even among those amphibious monsters which had the advantage of wings. A sudden irruption of water from the fathomless deep into the igneous gulf, was enough to set all the fiery and turbulent elements in motion, and strike terror through the regions of the sea.

There is one supposition, which, were it properly set forth by a geological writer of established reputation, would perhaps be received, and hailed, as fully confirming this history and course of things: namely, the supposition that this globe, either before or after its surface began to grow cool and solid, became the abode of the fallen angels, and that they had, under certain limitations, control over its elements and products. Of course they could not, nor would they have occasion to, create any thing out of nothing; but who can tell how far they might, in conjunction with the laws of Nature, have had something to do touching the variety, character, and destiny, of the animals which were produced. That they have a propensity to

take possession of the lower animals, at least when about to pass from one element into another, is rendered sufficiently evident by what is recorded of the herd of swine. A further probable argument might be derived from the forms and armature of some of those ancient creatures, especially the reptiles, and from such names as dragons, serpents, &c., which doubtless were bestowed on them on account of their natures and propensities, and particularly their proneness to assail and devour one another. This view of the case might, by-the-way, go far to account for the fact, that man, on coming into possession of the earth, and engaging in the business of destroying his fellow-creatures, should follow the example of his predecessors, in many other respects, as well as in giving to his warships such names as porcupine, shark, scorpion, crocodile, wolf, grampus, tiger, vulture, &c., and by analogy, such as Vulcan, *Ætna*, Spitfire, &c.

Should any one, speculating on the fact that tropical plants and animals once flourished as profusely in the Arctic as in the Equa-

torial regions, conclude that the sun must have been created for the special purpose of furnishing the extraordinary quantity of light and heat required at the poles under those circumstances, and proceed to establish his inference by referring to the fossil remains of those regions, specifying, as to the plants, their extreme dimensions, luxuriance of growth, and other particulars, and, as to the animals, from the minutest families of *indusiæ* to the largest *mammalia*, the fact that they had eyes as well as stomachs ; and should he go on to infer, that the sun, having performed this important office during countless ages, and supplied all the light and heat which were necessary during the long nights of his absence, as well as during the alternate periods of his visibility in the respective polar circles, till "the great year of geology" had elapsed, was shorn of his superfluous beams, and restricted in his office, when, for the reception and accommodation of man, the earth was reconstructed, and brought into that improved and felicitous condition which it now enjoys, with its congealed arctics, its frigid and torrid

zones, and the storms, vicissitudes, and uncertainties of its temperate latitudes; he would but exemplify the spirit of that theory, which, under the intoxicating influence of novel discoveries and incomprehensible facts, and in all the affectation and pride of science, seeks to make the earth its own interpreter, disregarding or postponing all consideration of the inspired volume; he would but exhibit the spirit of that philosophy which discerns more light in the phosphorescence of a lizard's bones, than in the orb of day—more meaning in a fossil shell, than in the sacred oracle.

The most stupendous fact, within the cognizance of man, in the whole field of his observation and research, is the existence of that volume which discloses to us all that we know of the invisible; all that we know, or can divine, of the final causes, reasons, purposes, designs, of the creation, of the earth and its inhabitants, and of the changes they have undergone, or are yet to undergo. When regardless of this source of information, the philosopher of a fallen race, worn to a skeleton by the labour of his physical researches,

and mentally subdued by the hallucination of a single idea, sets himself to account for the facts which he discovers, reasoning from an infinite variety of details to the reasons and causes of them, we need not wonder at his credulity, his presumption, his monstrous theories, his dogmatism, his intolerance, his skepticism. When he puts that volume aside for teaching what he does not like, or because he deems it too modern, too unphilosophical, or too obscure, to throw any light upon his science, he turns away from its author, fixes his gaze upon a world of creatures, unassociated with any direct or certain connection with the power or wisdom of a Creator, and plunges into the dark charnel-house of petrifications, and the illimitable vortex of duration. Science, indeed, helps him in the discovery of facts ; but, in reasoning on them, he exhibits only the blindness and imbecility of those unassisted faculties, which he employs in that process. Were he content to abstain from theorizing, from attempts to be wise in what is far beyond his sphere ; content with the discovery and disclosure of facts without affect-

ing to account for them, he would deserve respect and applause for the toil he undergoes, the patience, the self-denial, the diligence, the skill, the perseverance, evinced by his researches, and for the practical utility of his labours. But when he treats the Book of Divine revelation with contempt, and sets up his wisdom in its place, it is quite too much for him to claim or receive the sympathy and homage of any Doctors of Divinity, or other "professed friends," whose regard for that Book exceeds their ambition to be thought learned in physical science, and who would not purchase the reputation, by swallowing, blindfold, any dose prepared for them.

CHAPTER X.

A brief notice of the opinions of the geological writers, as to the inadequacy of the Noachian Deluge to account for the changes which have taken place on the surface of the earth, or any considerable portion of them,

is subjoined, not with a view to suggest or support any theory of the effects of that catastrophe, as to their extent, or the mode of operation by which they were produced. The Scripture narrative is delivered in such terms as to authorize the belief that the effects of that visitation, were as extensive as the object and reason of it can, to any one, appear to have required. The narrative gives it all the characters of an extraordinary visitation of Divine Providence. It was a curse upon the earth and its inhabitants. "God looked upon the earth, and behold it was corrupt: for all flesh had corrupted his way upon the earth. And God said unto Noah, the end of all flesh is come before me: for the earth is filled with violence through them: and behold, I will destroy them with the earth. And behold I, even I, do bring a flood of waters upon the earth, to destroy all flesh wherein is the breath of life, from under heaven: and every thing that is in the earth shall die.—And all flesh died that moved upon the earth, both of fowl and of cattle, and of beast, and of every creeping thing that creep-

eth upon the earth, and every man: all in whose nostrils was the breath of life, of all that was in the dry land died. And every living substance was destroyed which was upon the face of the ground, both man, and cattle, and the creeping things, and the fowl of heaven; and they were destroyed from the earth; and Noah only remained alive, and they that were with him in the ark." Immediately after the event, "The Lord said, I will not again curse the ground any more for man's sake; for [or though] the imagination of man's heart is evil from his youth; neither will I again smite any more every thing living, as I have done." And to Noah and his sons, He said, "I will establish my covenant with you; neither shall all flesh be cut off any more by the waters of a flood; neither shall there any more be a flood to destroy the earth."

Mr. Lyell, in his brief notice of the "Supposed effects of the Flood," alludes to the opinions which had been entertained among the learned, on the question "whether the Deluge of the Scriptures was universal in

reference to the whole surface of the globe, or only so with respect to that portion of it which was then inhabited by man. On the latter supposition, he thinks such an event might be accounted for by the sudden outbreak of "extensive lakes elevated above the level of the ocean," as Lake Superior is ; or by the depression of large tracts of dry land below that level. He refers to volcanic and other phenomena, as indicating the improbability of the Flood having been universal ; and observes, " that in the narrative of Moses there are no terms employed that indicate the impetuous rushing of the waters, either as they rose, or when they retired. On the contrary, the olive branch brought back by the Dove, seems as clear an indication to us, that the vegetation was not destroyed, as ^t was then to Noah, that the dry land was about to appear."

He concludes as follows : " For my own part, I have always considered the Flood, when its universality, in the strictest sense of the term, is insisted upon, as a preternatural event far beyond the reach of philoso-

phical inquiry, whether, as to the causes employed to produce it, or the effects most likely to result from it. At the same time, it is clear that they who are desirous of pointing out the coincidence of geological phenomena with the occurrence of such a general catastrophe, must neglect no one of the circumstances enumerated in the Mosaic history, least of all so remarkable a fact as that the olive remained standing while the waters were abating." The apparent candour of the former of these sentences is wanting in the latter. The history does not affirm that the olive remained standing till the waters were wholly withdrawn, as the sentence seems intended to imply. And it is to be observed, that Noah waited more than three months longer before he left the ark.

The following remarks are suggested by the views of this writer.

1. He wholly omits all reference to any moral reasons for the Deluge, whether that event was local or universal, preternatural, or only the effect of natural causes.
2. He assumes that those who believe the

Deluge to have been preternatural and universal, are justly to be expected to point out the coincidence of geological phenomena with such a general catastrophe. Which is as much as to say that one can have no sufficient grounds for such a belief, unless he can point out such coincidence ; that the evidences of geological phenomena, that is, the inferences made therefrom, are superior to all other sources of evidence, and are to be taken as the criterion in deciding what the Scriptures teach. It might, with equal reason, be said, that he who learns from the Bible, and believes on that authority that there was a moral reason for the creation of the world out of nothing, must show how such creation could be effected, and point out the coincidence of geological phenomena with his notion of such a process ; and that he who, on the authority of Scripture, believes in a resurrection, should be able to explain, " How the dead are raised up, and with what body they do come."

3. He refers to the olive leaf as the most remarkable circumstance in the narrative, against the supposition, that the flood pro-

duced any considerable effects ; as though the narrative in that particular was to be taken literally, and relied on, without even an attempt at explanation, though apparently inconsistent with other parts of the history.

4. His work, at large, is occupied in so accounting for the changes in the earth, as to leave nothing to be accomplished by the flood. In accomplishing this task, however, he treats of the upheaval of mountains to account for existing phenomena, in a way, and with illustrations respecting their composition, and the existence of sedimentary deposits on their highest summits, which may well justify the supposition, that such upheaval may have occurred, for the most part, since the epoch of the Deluge, and the change of climates ; and that there were no very elevated summits prior to that epoch.

The whole time, from the day on which "all the fountains of the great deep were broken up, and the windows of heaven were opened," to the going forth from the ark, was twelve months and ten days, or 370 days. The ark rested on the 150th day ; on the

223d day the tops of the mountains were seen. Forty-seven days after that, or on the 270th day, the Dove returned with an olive leaf. It was still 100 days before the earth was dry enough to permit Noah to leave the ark. Now if the flood was as long rising as falling, its subsidence commenced on the 185th day, in which case more than half the time of subsidence elapsed after the return of the Dove ; if the subsidence commenced immediately after the ark rested, then nearly half the time occupied by that process passed after the return of the Dove. In either case, if the flood was preternatural and universal, and covered the tops of the highest mountains to the depth of fifteen cubits, or twenty-six and a quarter feet, then the fall during the first half of the time occupied by the subsidence, can hardly be conceived to have been such as to expose any part of the general surface near the base of the mountain.

If the tree grew on the mountain itself upon which the ark rested, midway, or at a higher or a lower point, between its summit and the level of the surrounding country,

then it may well be supposed to have maintained its position, since the mountain remained, whatever changes took place elsewhere on the surface of the earth. That its position was far above the ordinary level of the country, would seem to be clearly indicated by the fact, that 100 days were required for the further subsidence of the waters; and if it occupied so elevated a position, it must of course have been upon the side or top of some mountain.

If the olive was not situated on a primitive mountain, which remained unchanged by the deluge, but upon the ordinary soil, there was ample time, within the remaining 100 days, for its destruction, and for any imaginable extent of changes. If the leaf was plucked by the dove from a tree still standing in its natural position, probably the uppermost branches only were exposed above the surface of the water; for it was but seven days before that the dove found no rest for the sole of her foot—for the waters were on the face of the whole earth. Whatever changes in the condition of the earth the flood may have

occasioned, were perhaps more likely to be effected towards the last stages of its subsidence than at an earlier period.

It therefore does not follow, from this remarkable fact in the narrative, that the flood produced no considerable effects in the condition of the earth. Its effects, whatever they were, may, for the most part, have taken place, universally, or in particular regions, after the ark was securely seated on its resting place ; and even after the plucking of the olive leaf.

The observation of Mr. Lyell, that in the narrative of Moses there are no terms employed that indicate the impetuous rushing of the waters, either as they rose, or when they retired, is far stronger than the case will justly admit. The narrative includes such terms and phrases as the following : " I will destroy them with the earth—I will cause it to rain upon the earth forty days and forty nights, and every living substance that I have made will I destroy from off the face of the earth ;—all the fountains of the great deep were broken up, and the windows of heaven

were opened—and the waters prevailed and increased greatly upon the earth—and all the high hills that were under the whole heaven were covered—and the mountains were covered—and God made a wind to pass over the earth, and the waters were assuaged; the fountains also of the deep, and the windows of heaven, were stopped, and the rain from heaven was restrained; and the waters returned from the earth continually—and the Lord said, I will not again curse the ground any more for man's sake; neither shall *all flesh* be cut off any more by the waters of a flood; neither shall there any more be a flood to *destroy the earth.*"

Now, whether in so very brief a narrative of the means and operations employed in a catastrophe of a year's duration, which destroyed every thing that had life, such a statement as that all the fountains of the great deep were broken up, does not indicate vast and universal convulsions throughout the regions of the ocean, might at least be matter of question even to a geologist. If the statement was intended in any degree to account

for the extent of the deluge, or to indicate the supply of waters required by the curse previously denounced upon the earth, then it is but just to consider it as indicating the most stupendous and universal action of the waters which can be conceived of; and especially, since the breaking up of all the fountains of the deep was coincident with the outpouring of such a rain during forty days and nights, as to call for the expression in the narrative, "the windows of heaven were opened."

It is not until after the flood had attained its utmost height that we are informed that the fountains of the deep were stopped. The eruptions, or other violent action in and beneath the ocean, would seem, therefore, to have continued as long as the waters continued to rise over the land. Then, brief as the narrative is, another agent is mentioned as being introduced and employed for the sole purpose of driving the waters off from the land. "God made a wind to pass over the earth, and the waters were assuaged." The effects produced by this agent are the counterpart of those produced by the breaking up of

the fountains of the deep, and may have been of like extent and violence. If the one was necessary to the raising of the waters, the other was equally necessary to assuage them. If agitation and violence attended their rising, why should they not much more attend their subsidence, since the agent employed in the latter operation is known to be capable of producing effects of that nature to any conceivable extent? And why should such an agent be specially introduced and announced, if a gradual and tranquil subsidence took place?

But what degree of coolness must a geologist have, to contemplate such a description of a deluge, caused by the breaking up of all the fountains of the great deep, and the incessant pouring down of rain for forty days and nights, on the unequal surfaces of the earth, and perceive no likelihood of any torrents, any impetuous rushing of water, being occasioned; a geologist who can satisfy himself that the ordinary action of water, with the aid of the atmosphere, has in course of time worn down solid crystalline rocks enough

to constitute the whole mass of stratifications ; a geologist, who must have witnessed the effects of an ordinary rain continued for three or four days, in overflowing the channels of rivers, swelling creeks into torrents, uprooting trees, excavating the soil, and inundating the lower levels of the region ; a geologist, in short, who can discern the mighty effects of small causes, if they are but natural and philosophical, but who declines all consideration of causes not in that category.

Now, if any part of the Mosaic account of the Deluge is to be taken as meaning what it appears to mean ; if that visitation was a curse previously denounced by the Creator and moral Governor of the world ; if it was executed by his own direct interposition, causing a preternatural rain of forty days, and breaking up the fountains of the deep ; if the tenants of the ark were preserved, during twelve months, in their pent-up condition ; if the ark itself was preserved and safely grounded on an elevation above the reach of the agitations and convulsions which attended the subsidence of the waters ; if these things took

place, then the same power which created the world was specially or supernaturally exerted on this occasion; the operations, to whatever extent they may appear to have been in harmony with the laws of nature, or the ordinary effects of second causes, were miraculous, and if miraculous, the magnitude of the results cannot be urged as an objection to the mode of their production. Nor can the details comprised in those operations, any more than the extent of the operations themselves, supposing them to have included all the principal changes in the crust of the globe, be urged as an objection. It is as conceivable and as credible that the materials of the sedimentary formations should, by miraculous interposition, be separated, disposed in layers or beds, and solidified in a rapid as in a gradual manner. Indeed, with respect to a large portion of the results, it can scarcely be said to be conceivable that they should ever have been produced by a slow process.

If the Scripture narrative of the Deluge be admitted, and if it involved a miracle, then the geological theory cannot be maintained;

for that account includes a denunciation and a reason for the catastrophe, which, on the geological theory, have had no accomplishment. And here is the point where geology and the Bible are at issue. It is because the geologist assumes to account for the phenomena of the earth by ordinary second causes, to the exclusion of preternatural interpositions, and to treat the subject as though it were wholly independent of moral causes, wholly disconnected from man, and from moral government, that his speculations unavoidably conflict with the Bible, and carry him into the field of skepticism; where, if he does not openly reject the whole of the sacred records, he rejects, or puts such construction on portions of them, as virtually to discredit and subvert the rest.

The suggestions and arguments of Dr. Smith in opposition to the universality of the Deluge, and to the supposition of its having produced any considerable effects, are only such as might be expected from a writer under the double spell of a preconceived and favourite notion of a local and temporary sub

mergence of a certain region in Asia, and of the theory which assigns to the changes in the earth an inconceivable antiquity ; and are deemed unworthy of any particular notice. Were his views to be taken as correct, a great deal more sagacity than they indicate would be necessary, to devise any tolerable reason why 120 years of preparation for the event was necessary, or why an Ark should have been constructed at all for the preservation of eight persons and certain animals, including the winged tribes. They might have all migrated from the scene of his local deluge, probably in three or four weeks ; and unless the Indian Ocean was raised very suddenly, and at the same time that the region to be deluged settled down, so as to pour its waters at once into the cavity, instead of requiring six months for that operation, the rest of the inhabitants and animals might have escaped as well as Noah. Moreover, if such a region settled down, and such an ocean was poured into it, what occasion could there have been to increase the supply of water by opening the windows of heaven

and pouring down rain for 40 days and nights ? He quite trembles at the idea that a miracle should be supposed to account for any of the facts of an universal Deluge ; and yet his own theory involves or needs ten miracles to one required by the Scripture narrative. But the whole of his views on this subject are utterly puerile, if there was any thing preternatural in the Deluge itself or in any of its effects, and if there was nothing preternatural in the case, the Scripture account may as well be given up first as last. If there was a miracle, it may just as well have been a large as a small one ; and doubtless was as large and as comprehensive as the occasion required. The whole matter turns upon this : was there a reason, as the Scriptures clearly intimate, for an universal Deluge ? If there was, and until it can be demonstrated that there was not, it is idle, not to say impious, in man to array his petty objections to the possibility of its occurrence.

The facts of Geology are not to be denied. That the stratified rocks with their fossil remains have been deposited since the creation,

is past all doubts. This is the leading fact. The details comprised in it may puzzle and confound human reason and science, and occasion every variety of construction and hypothesis, without resulting in any thing conclusive or satisfactory. The great question is, What was the occasion or reason of these changes? If there was a moral reason for them, then they must have taken place since the creation and fall of man. If the reason is founded in his apostacy, then so far as the Scriptures enlighten us upon the subject, it is safe to conclude that the Noachic Deluge was the means, or among the means, by which the changes were effected; and in that case there can be no more objection to our supposing a supernatural interposition to the extent required to account for the results, than there is to our believing in any miracle recorded in Scripture.

The Scriptures tell us once, and but once, of the fountains of the great deep being broken up. Geology indicates a change in the locality of the seas. The depth of the sedimentary deposits is to the diameter of the globe

as the thickness of a coat of varnish to an artificial globe. Now, with such a reason for it as the apostacy of man, it requires no great stretch of imagination to conceive that the breaking up of all the fountains of the great deep, with the other operations connected with the Deluge, the mechanical and chemical agencies, and electric and igneous forces, should have thrown all the materials of the sedimentary deposits into a state of solution and suspension in the waters, distributed those materials into homogeneous strata, diffused the fossil relics, changed the locality of the seas, and peradventure left the superficial area of ocean water several times as great as it was before. This reason, if it was a reason at all, was sufficient to occasion all the results which geology can point out.

If the apostacy of man furnishes the reason for the physical changes which have taken place in the condition of the earth ; if those changes fitted it for the abode of a fallen race ; if, pursuant to the wondrous intervention for man's recovery, of Him by and for whom the earth was created, it is yet to be renovated

and restored to its primitive state, and thence to be the abode only of holy and harmless beings, then is the subject cleared of all inherent and essential difficulties. Its moral requisites are satisfied, which is first and chiefly indispensable, in a matter involving the creation, character, condition and history of rational and accountable creatures, as well as the creation and condition of the earth itself, and of its irrational inhabitants. If there remain physical phenomena which science cannot explain, so there are upon the popular theory, and upon every theory. The complaint is, that science is not content to keep within its limited and appropriate province. Can science offer any explanation as to "the first introduction of a moral and intellectual being" on the earth? or as to the introduction of moral evil, by which his character and condition are, by the concession of all, so much affected? or as to the line, if there be one, which separates the purpose, province, and administration of moral government, from that which the Creator exercises over matter and irrational creatures? Upon these and

innumerable other questions, connected more or less directly with the phenomena and physical condition of the earth, science is necessarily mute.

Let it be considered that if there was such a moral reason for the changes in the earth, it is no more incumbent on those, who believe that reason to be indicated in the Scriptures, to account for the mode in which the changes were effected, or to specify the instrumentalities employed, than it is to account for the creation, the fall of man, the resurrection, or any other extraordinary event or procedure in the Divine administration. We have an account of the Deluge and of the reason for that visitation, which will at least allow of the supposition of the changes in question having been produced by its instrumentality and in connection with it. It furnished the medium, water, which all allow to have been employed in those changes. If any of the phenomena attending it were supernatural, the shortness of the time of its duration, considered in relation to the magnitude of the results, can no more reasonably be urged as an

objection, than the portion of time occupied in the creation can be urged as insufficient for the accomplishment of that work. It is the only event recorded in Scripture to which the changes can be assigned ; and if it does not indicate the means and the occasion, we are without any historical notice of either. Here it were the part of wisdom to pause. If to the mind of a geologist objections occur founded on the phenomena which he observes ; if he cannot reconcile those phenomena with the supposition that the changes took place in connection with the Deluge, whether on account of their character or extent, let him consider the intrinsic difficulties of his own theory, and the still greater difficulties which attend its bearing on Divine Revelation.

CONCLUSION.

The Holy Scriptures enable us to understand that it was the design of the works of creation and providence, to manifest the Di-

vine perfections to intelligent creatures, in connection with their free agency and the eternal purposes and moral government of Jehovah. It is sufficiently indicated that such a manifestation to creatures of whatever degree of intellectual capacity, and in whatever condition or mode of existence, required the being and conditions of the material creation, and the correlative exhibition of outward and visible agencies, instrumentalities, and results.

This manifestation was made, we are informed, by the eternal Son of God, and with especial reference to his mediatorial work; in the execution of which he became incarnate, and appeared visibly on earth, "God manifest in the flesh, seen of angels." In this state he signalized his Omniscience and other Divine perfections, by acts which showed his supreme lordship and power over all created natures. Hence he is represented as the image or visible manifestation of the invisible God. 'No man hath seen God at any time—the Son, he hath declared Him.' For by Him were all things created that are in

heaven and that are in earth, visible and invisible—all things were created by Him and for Him. And He is before all things, and by Him all things consist.' He is declared to be the 'Head over all things with relation to the Church—the revealer of the mystery which from the beginning had been hid in God, who created all things by Him to the intent that unto the principalities and powers in heavenly places, the manifold wisdom of God might be known by means of the Church, according to the eternal purpose which he purposed in Christ Jesus our Lord.' 'He is gone into heaven—angels and authorities and powers being made subject to Him.' And as a result of his wondrous interposition, it is declared, 'That at the name of Jesus every knee shall bow, of things in heaven and in earth, and that every tongue shall confess that he is Lord to the glory of God the Father.'

In accordance with this declared purpose of manifestation, the actual creation is announced in numerous passages. 'The world was made by Him.' 'Thou, Lord, in the be-

ginning hast laid the foundation of the earth ; and the heavens are the work of thy hands ; they shall perish, but Thou remainest ; and they shall all wax old as doth a garment, and as a vesture shalt Thou fold them up and they shall be changed.' ' For this they,' the scoffers, ' are willingly ignorant of, that by the word of God the heavens were of old, and the earth, standing out of the water and in the water ; whereby the world that then was, being overflowed with water, perished, but the heavens and the earth which are now, by the same word are kept in store, reserved unto fire against the day of judgment and perdition of ungodly men !' ' Thou art worthy—for Thou hast created all things, and for thy pleasure they are and were created.'

The connection and similarity of phrases in the passages in which the creation is frequently referred to, is worthy of notice.

' Thus saith God the Lord, he that created the heavens ; He that spread forth the earth.' ' I have made the earth and created man upon it—I have stretched out the heavens.' ' Thus saith the Lord that created the heavens, God

himself that formed the earth, and made it; He hath established it; He created it not in vain; He formed it to be inhabited.' 'Who created heaven and the things that therein are, and the earth and the things that therein are, and the sea and the things which are therein.' 'For, in those days shall be affliction, such as was not from the *beginning* of the creation which God created, unto this time.' 'From the *beginning* of the creation God made them male and female.' 'In the *beginning* God created the heavens and the earth.' 'In six days the Lord made heaven and earth, the sea, and all that in them is.' The Lord, which made heaven and earth, the sea, and all that therein is.' 'He hath made the earth by his power, He hath established the world by his wisdom, and hath stretched out the heavens.' 'Thou art Lord alone; Thou hast made heaven, the heaven of heavens, with all their host, the earth and all things that are therein, the sea and all that is therein.' 'My help cometh from the Lord which made heaven and earth.' 'The Lord that made heaven and earth, bless thee.' 'The living God, which made hea-

ven and earth, the sea, and all things that are therein.' 'Worship Him that made heaven and earth, and the sea, and the fountains of waters.' 'Thou hast made heaven and earth.' 'Thou hast made the heaven and the earth by thy great power.'

Again, the figurative language employed in numerous instances, indicates the existence of similar ideas and associations in the minds of the different writers respecting the creation of the earth and the changes it has undergone. The prophet Jeremiah thus depicts the desolations and miseries which were to be visited upon the Jews for their wickedness. 'I beheld the earth, and lo, it was without form and void ; and the heavens, and they had no light. I beheld the mountains, and lo, they trembled, and all the hills moved lightly. I beheld, and lo, there was no man, and all the birds of the heavens were fled. I beheld, and lo, the fruitful place was a wilderness, and all the cities thereof were broken down, at the presence of the Lord, and by his fierce anger.' So Isaiah : 'Thou shalt be visited of the Lord of Hosts, with

thunder and with earthquake, and great noise, with storm and tempest, and the flame of devouring fire.' 'For this is as the waters of Noah unto me ; for, as I have sworn that the waters of Noah should no more go over the earth, so,' &c. 'For the mountains shall depart, and the hills be removed, but my kindness shall not depart from thee.' And David : 'The channels of the sea appeared, the foundations of the world were discovered at the rebuking of the Lord.' 'The earth shook and trembled, the foundations of heaven moved and shook.' 'All the foundations of the earth are out of course.'

Isaiah : 'He who fleeth from the noise of the fear shall fall into the pit ; for the windows from on high are open, and the foundations of the earth do shake. The earth is utterly broken down, the earth is clean dissolved, the earth is moved exceedingly. The earth shall reel to and fro like a drunkard, and shall be removed like a cottage ; and the transgression thereof shall be heavy upon it.' Micah : 'Behold, the Lord will come down, and tread upon the high places of the earth, and

the mountains shall be molten under him, and the valleys shall be cleft, as wax before the fire, and as the waters that are poured down a steep place.' ' Arise, contend thou before the mountains, and let the hills hear thy voice. Hear ye, O mountains, the Lord's controversy, and ye strong foundations of the earth.'

These and numerous other passages strongly imply that one or more extraordinary catastrophes or violent convulsions, by which great changes had been effected in the state of the earth, were familiar to the minds of the writers. And on a careful examination it will appear, that the statements and references throughout the sacred volume, whether literal or figurative, concerning the creation, the objects which it comprehended, the purpose of it, its era, the changes which have taken place, and those which are yet in prospect, are all harmonious and concurrent with the import of the Mosaic record as commonly understood.



